For Tandy's 100, 200 and 600 Portables and 1000, 1200, 2000 and 3000 MS-DOS Computers

PCM®

The Personal Computer Magazine for Tandy® Computer Users

Vol. III No. 9
March 1986

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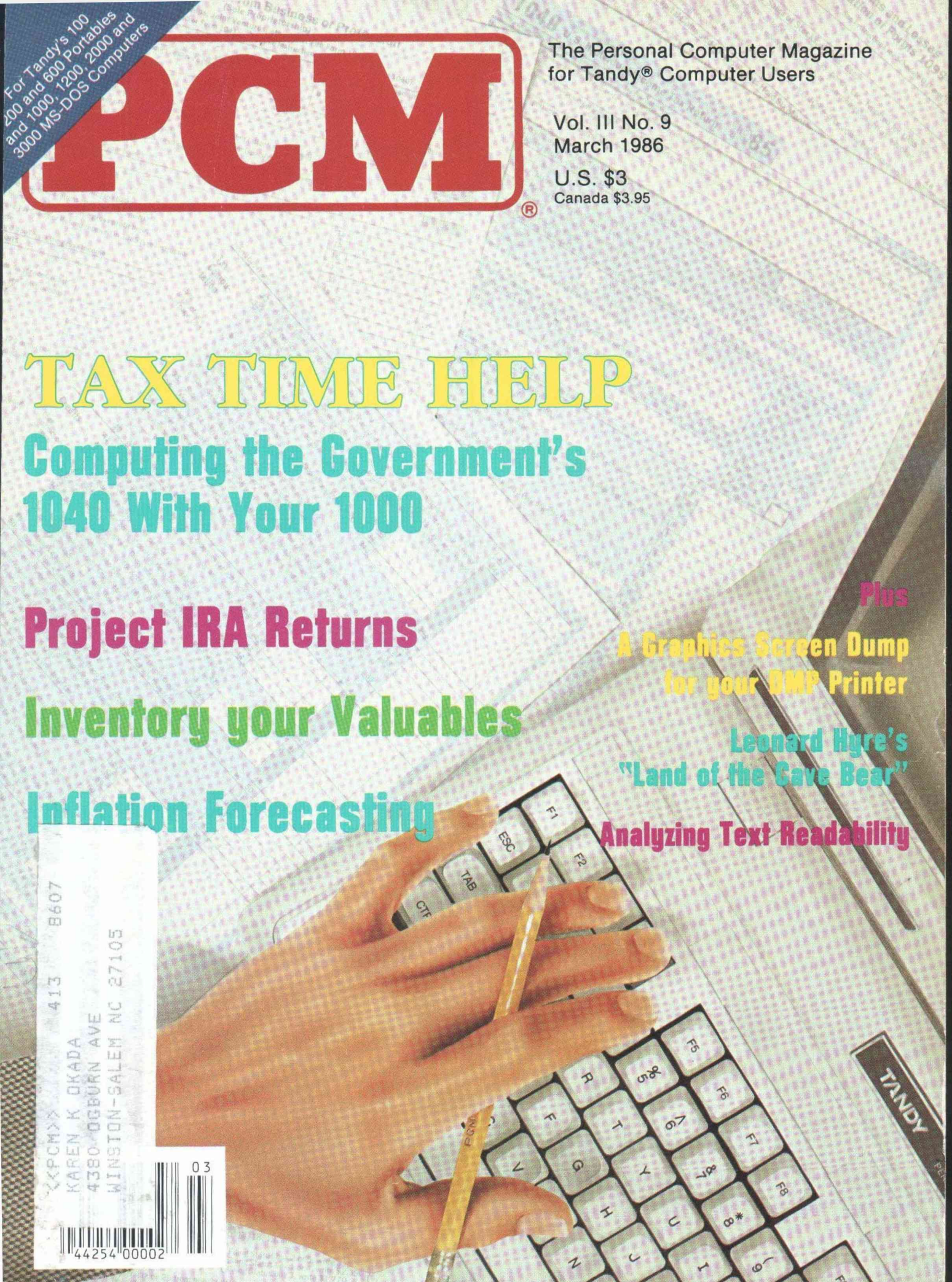

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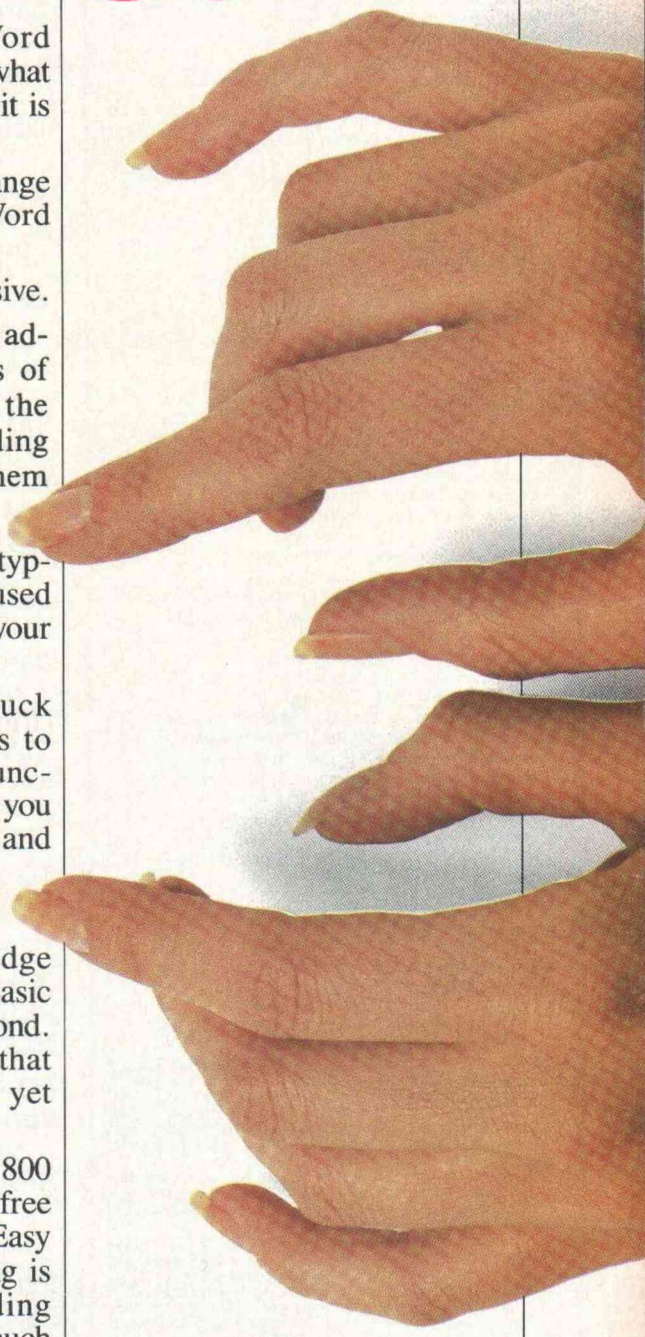

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The Personal Computer Magazine for Tandy® Computer Users

March 1986 Vol. III No. 9

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Tandy computers offer everything . . . almost

Check out the software that completes their systems —*filePro*®

Tandy MS-DOS Software Comparison Chart

	pfs® File/Report	dBase™ II	*filePro* 16 Smallware
GENERAL CHARACTERISTICS:			
Menu driven	yes	no	YES ✓
Allows user to create integrated business systems	no	programmer required	YES ✓
Developed systems and data can be moved to multi-user environments	no	no	YES ✓
Professional support available from the software's authors	no	no	YES ✓
PRICE	$265	$595	$495
CAPACITIES:			
Fields per record	100	32	999 ✓
Characters per record	1679	1000	4608 ✓
Records per file	1300	65535	16,000,000 ✓
Indexes per file	1	7	12 ✓
Number of digits per numeric field	20	10	24 ✓
Number of files usable concurrently	1	2	10 ✓
Files span multiple drives	no	no	up to 8 ✓
FEATURES:			
Full-screen facility for creating custom screen layouts	yes	no	YES ✓
Full-screen facility for creating custom report layouts	no	no	YES ✓
Built-in field types (error checking)	no	3	12 ✓
User-defined field types	no	programmer required	200 ✓
Conditional math	no	programmer required	YES ✓
User-defined menus	no	programmer required	YES ✓
Change file layout without losing existing data	possible	possible	automatic ✓
Data protection	no	programmer required	YES ✓
Password security	no	programmer required	YES ✓

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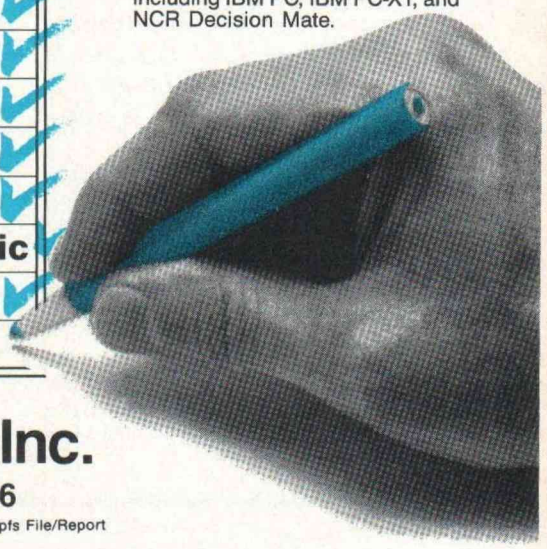

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Putting the Consumer Electronics Show into Perspective

I recently stepped off the plane from Las Vegas where I attended the Winter Consumer Electronics Show, a five-day extravaganza that seems to crowd so much electronic equipment into the Las Vegas Convention Center that there is at least one little LED glowing for every man, woman and child in North America.

It wasn't much more than a couple of days after the plane (a late TWA flight, as usual) deposited me back in 20-degree weather (it was 70-plus in Vegas) that I was blessed with picking up a syndicated column to read that WCES "proved" the personal home computer market had died.

Spare me the pundits.

I must read a zillion "computer columns" and newsletters every month. And it seems everyone has a different interpretation. Of just about everything. In case you are unfortunate enough to have this same pair of clowns appear in your local paper, I think it is important to put WCES into perspective.

The first WCES I attended was some four years ago and I was amazed by all the electronic gadgets. Thanks to some friends at Antenna Electronics (a RAINBOW, PCM's sister publication, advertiser at the time), I actually got a decent room and some help finding my way around. But at the time, I bemoaned the lack of computers at the show and the fact that Tandy was "missing" from the list of exhibitors.

True again this year, there were few computer companies showing products and no Tandy. How come?

Well, if you want to go to a computer show, try COMDEX or NCC. If you want to buy stereos, CD players, TVs and VCRs, go to CES. (You can also buy more electronic doo-dads there, and some interesting watches, too, than in any other place on earth.) But if you want computers, don't try CES.

I took special note of the "distributors" and "retailers" at the show (it is easy, everyone is color-coded by name badge). As Ivory Soap says, 99 and 44/100 percent of them were from video and audio outlets.

And why no Tandy? Simple: CES is a show open only "to the trade." (They have signs to that effect.) Tandy, with its worldwide network of stores (did you know there are more Radio Shack stores than McDonalds?) doesn't need to sell to dealers. It sells to itself. And then to you.

(A footnote: Yes, Tandy people certainly *were* there. Usually they blanket the show looking for products they might want to private-label. This year was no exception.)

I am tired of pundits who don't know the difference between CES, NCC and COMDEX making "learned observations" based on bad data. Computer people have a term for it — "GIGO — Garbage In, Garbage Out." Oh well, they have to have something to write about and they probably were tired of talking about CD ROMs.

I wish someone, somewhere, with some expertise, would somehow convince some big syndicate to let them write a column about computers. It sure would clear the air. Most of what I read in what is called the "popular press" appears to be little more than a preconceived notion on which the writer or writers try to find a few facts on which to hang them.

One of the nicest things about being in Vegas is, believe it or not, the cab drivers. In three to four trips there a year, I have met only one surly fellow out of a whole raft of trips all over town.

At CES I met Murray Rosner, who drives a cab but also writes a "taxi column" for the *Vegas Visitor*, one of those free newspapers that tells what's going on. Murray's column about COMDEX, I think, illustrates my point about the difference between the two shows and I'd like to quote something he said here:

"Every year when COMDEX arrives, a new word or phrase enters our vocabulary. In years past, there was 'state-of-the-art,' meaning the highest technically advanced. Then there was 'artificial intelligence.' Everybody used that term, but I couldn't get a clear definition from a soul.

"Last year it was 'IBM compatible.' That simply meant all programs were to be standardized, a blessing to both software manufacturers and dealers. This year it's 'VAR,' or Value Added Retailer. Then there's 'user friendly,' which means you won't panic when you sit down in front of the machine.

"There is no humor in this report because my kid just put down a deposit on a 'user friendly,' 'state-of-the-art' 'IBM compatible' computer from a 'VAR' and expects me to pay the balance — a classic case of 'artificial intelligence' on his part."

Final footnote: Did you know that Tandy sold more 1000s in the last quarter than IBM sold PCs? Does this mean people are finally getting smarter?

— Lonnie Falk

Also from the publishers of PCM . . .

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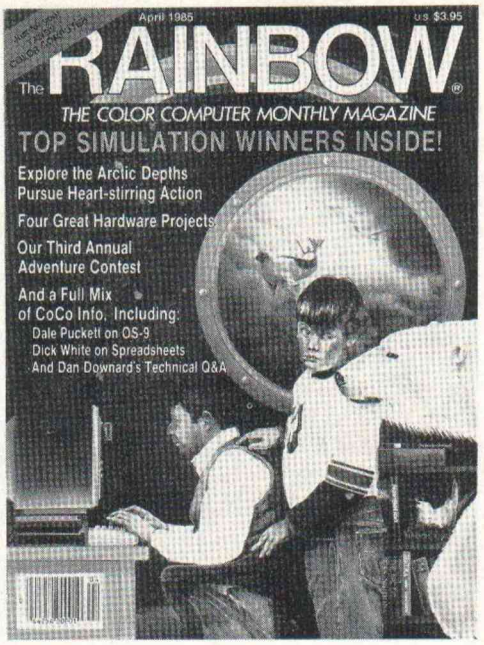

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In order to hold down non-editorial costs, we do not bill.

NEW MS-DOS

Editor:

The August issue of PCM referred to a new BASIC and a reversed MS-DOS for the Tandy 1000. My local Radio Shack store doesn't know anything about this and Computer Plus says they simply ship the latest revision. How can you tell if and when these changes are available? Will the BASIC and MS-DOS manuals, which are available separately, also be updated?

N.J. Wilkaitis
Energy, IL

Tandy has just released a new version of MS-DOS and BASIC for the Tandy 1000. The latest MS-DOS version is 2.11.22, and the latest BASIC version is 1.01.00. This upgrade may be obtained by contacting your local Radio Shack and making arrangements to bring in your original MS-DOS diskette and having the new version copied onto it.

When there is a product upgrade that Tandy classifies as "required," they notify all registered users of the product. It is therefore important, according to Tandy, to complete and mail all software registration cards as soon as you open the product package.

1000/1200 COMPATIBILITY

Editor:

I am the happy owner of a Tandy 1200. I have several friends who have the Tandy 1000; sometimes programs that run on my computer will not run on the 1000. I've also noticed that you often list programs for the 1000, but sometimes they are not rated for the 1200 as well. Since the 1000 is an IBM compatible as is the 1200HD, what is the difference between the two computers?

Larry Roberts
Lansing, MI

It is rare to find software that runs on a Tandy 1200 that will not also run on a Tandy 1000. This is usually due to the differences in the keyboard on the Tandy 1000 or its lack of support for the standard IBM monochrome adapter.

It is quite common, however, to find software written for the Tandy 1000 that will not function on the 1200. Since the Tandy 1000 supports more graphics and sound modes than the IBM PC or the Tandy 1200, software that uses these extended features, such as many programs listed in PCM, will not run on the Tandy 1200.

To determine if a program is going to run on your computer or not, look for your computer's model number in the upper right-hand corner of the lead page for the article.

DELPHI QUESTIONS

Editor:

I am writing to obtain additional information on Delphi.

I am a new computer user and have a limited knowledge of what they can do. However, I do want to learn all I can and I find the operation fascinating.

Just what is available on Uninet, Tymnet, etc.? What are the charges? What does it cost to join?

Thomas A. Larsen
Carmel, CA

Delphi is a computer information service, whereas Uninet and Tymnet are simply there to provide a communications link between your local telephone and the Delphi computers in Boston. You can think of Uninet and Tymnet as you would a telephone company. They are just a connection between you and the person you're talking with.

Delphi offers many services such as electronic shopping, news and weather, electronic mail and, of course, the PCM-sponsored MS-DOS Special Interest Group. In the MS-DOS group, you can find new software, share ideas and questions with other users, and perhaps learn a little more about the computer you're using. In addition, there are other groups for different special interests that you might find interesting.

PASCAL PROPONENT

Editor:

I recently puchased a Tandy 1000 computer through a mail order source. I saved over $320 just by paging through your magazine one day at a newstand and discovering their ad. By the way, I never would have discovered this mail order store or any other "non-Tandy" product source, had I picked up a copy of your magazine as sold at one of my local Radio Shack Computer Centers, but that is worthy of another letter.

I just wanted to congratulate you on what seems to be one of the highest quality "dedicated" computer magazines I have ever seen. I found all of your articles to be interesting and informative. I was also pleased to see how many third-party companies are actively supporting Tandy's MS-DOS line.

But the thing that really spurred me to buy your magazine, and write this letter, was the fact that I am a *Turbo* PASCAL devotee. This marks the first time I have ever seen a magazine publish a program written in this terriffic language. Now I will admit that before I purchased my Tandy 1000, I really didn't pay too much attention to the types of programs that were in magazines, but *Turbo* PASCAL programs must be few and far between. So you can imagine my surprise when I found *two* programs written in this language in just *one* issue of your magazine. That convinced me that PCM would be the magazine for me.

Please extend my thanks to the authors of these two programs in your January issue, Rick Boozer and John Harrell.

James K. Roth-Roffy
St. Louis, MO

Thanks for your kind words. We were frankly hesitant to print PASCAL programs, since not all users have access to a PASCAL compiler, but the response we've gotten from the two we published has inspired us to keep at it.

OK PASCAL programming wizards out there, let's see what you have!

PORTABLE PROTECTION PROBLEM

Editor:

After examining my article "Portable Protection" (January 1986), I found a few bugs in Listing 2, FILCDR.BA. I have corrected the errors and the corrections are as follows:

Delete lines 80-140 and replace lines 80-100 with the following lines:

```
80 IFNOTEOF(1)THEND=D+1:A=ASC
(INPUT$(1,1)):B=ASC(MID$(CO$,
(DMOD8)+1,1)):C=AXORBIFC=0ORC
=26ORC=127THENPRINT#2,CHR$(A)
;:GOTO80ELSEPRINT#2,CHR$(C
);:GOTO80

90 CLOSE1,2:IFTR=3THENKILLFI
$:NAME"ZZZZZZ.DO"ASFI$

100 MAXFILES=0:MENU
```

Chris Miller
Larchwood, IA

PRINTER PROBLEM SOLVED

Editor:

I would like to help answer a letter from a C.F. Thompson, Nelson, British Columbia, that appeared on Page 8 of your August 1985 edition.

I had the same trouble with double letters occasionally when a Tandy DMP-200 connected to my Tandy 1000. I bought both pieces, plus others, from a local Radio Shack dealer at the same time. I now have a 1000, two disk drives, 384K RAM, clock and calendar board, internal modem, DMP-200 printer and CM-2 monitor. I use *Multimate* mostly, some *DeskMate* and *pfs:Write* once in awhile.

When I reported this problem, the store manager knew nothing about it, but when I contacted the service man in the same building, he knew what was wrong. I have a very early model and apparently this same problem was experienced elsewhere. They made a change in the production. The printer pulse was marginally too long and sometimes the printer would reprint a character. There was a "Tech Tip," to modify the printer circuitry to let it trigger with the leading edge of the pulse and not the entire pulse. That fixed it nicely.

When using *pfs:Write*, the printer would not print the text. But, strangely enough, it would print a message saying that it could not print.

David I. Smith
Erie, PA

OF TANDY AND PCM

Editor:

I wish to bring to your attention a fairly trivial point in response to Lonnie Falk's statement ("LPRINT," December 1985: ". . . this marks the first time that John Roach . . . has been featured on the cover of a computer magazine." I refer you to the cover of the December 1984 edition of *80 Micro*. Pictured alongside a then-new Tandy 1000 is Mr. Roach, in an (almost) identical pose (even wearing the same suitcoat!). In fact, the two pictures are so similar they could both have the same caption: "Why is this man smiling?" The answer being, of course, "You never know *what* we Texans have up our sleeves, do you?"

Indeed, if Tandy keeps up this pace of technological innovation and price reduction (as witnessed by the Models 100, 1000 and 1200), they may be able to regain much of the market share that they lost through mishandling earlier on. I believe Tandy has of late shown considerable willingness to mend its ways and, among other things, to be much more responsive to popular demand.

PCM has, since its onset, been a powerful force to this end, and should be given quite a bit of credit for providing the impetus for many of these changes.

Tandy still has a "way to go" to reach perfection for many of its policies, and hopefully PCM will be here for quite some time to provide a voice for all of us who wish to both applaud and criticize Tandy. (Although I hope less of the latter will need to be done.)

Many kudos to you for your article "In defense of BASIC" in the same issue — it echoed my feelings exactly. Despite having introduced millions of novices to the world of programming, and almost certainly making the computer revolution as such possible, BASIC is frowned upon by the proponents of all the wonderful structured languages such as PASCAL and C. But face it, like our wonderful, unglamorous Tandy computers, BASIC is a true workhorse that gets the job done with a minimum amount of time and effort, and is more than adequate for all but the most demanding tasks.

Mark D. Deavult
Churchview, VA

HOMEWORD HINTS

Editor:

We are a two-person law office using a Tandy 1000 computer with duel disk drives. We use the Tandy *Homeword* word processing program.

We are very pleased with it and have come up with a way to get some symbols that we frequently use.

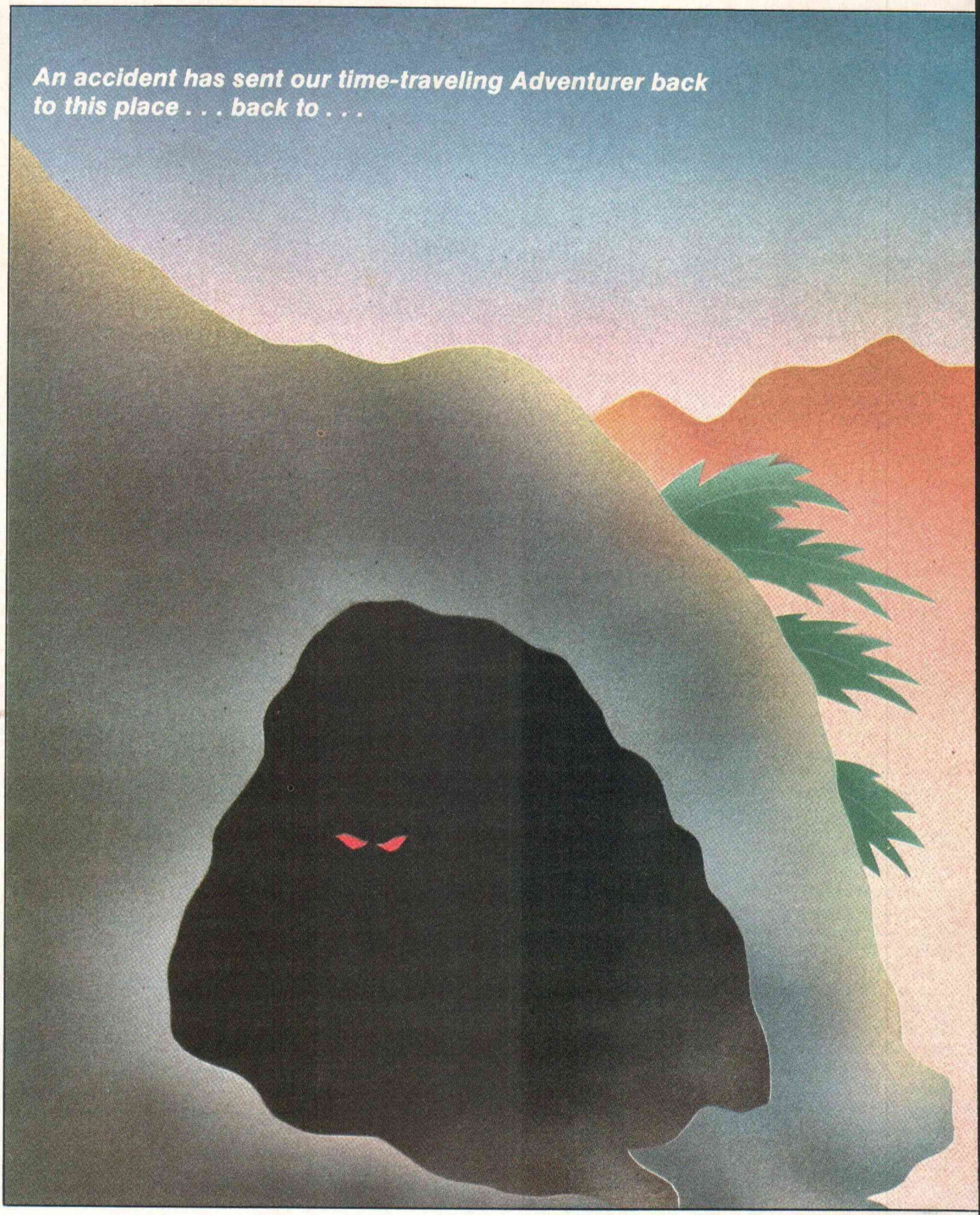
First, find the symbol you want in the column on the left. Next, depress and hold the ALT key while pressing the corresponding numbers in the right column on the numeric keyboard (do not use the numbers at the top of the alphanumeric keyboard).

You might or might not get a symbol like the one you want to print, but if in doubt, press F10 with the cursor over the symbol and see if the number displayed corresponds to the symbol you want.

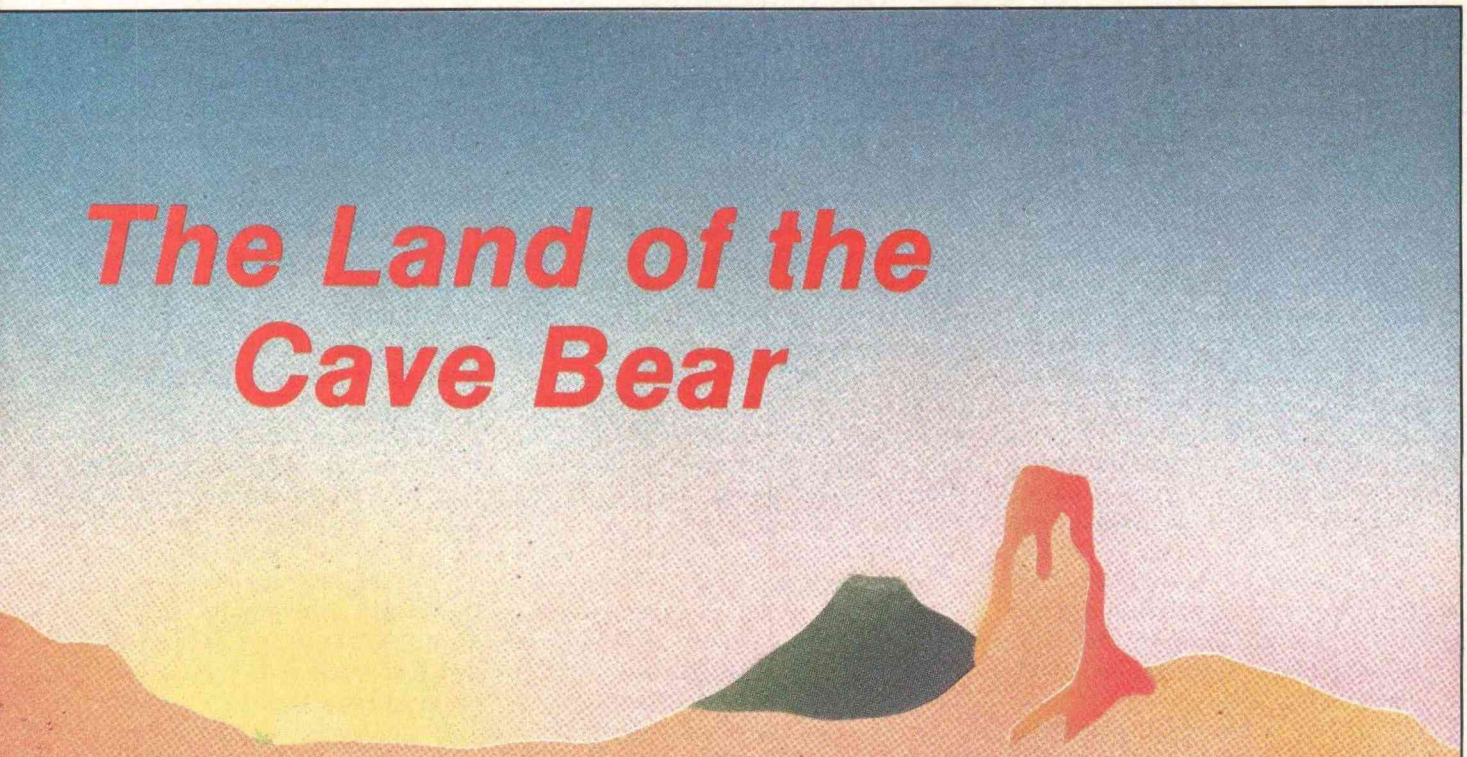
Symbol	Number
§	192
¢	222
¼	172
¾	173
½	174
¶	175
£	163
°	166
†	168
™	169
®	170
©	171

We enjoy your magazine, but we have not seen any articles on *Homeword*. We would love to see one, particularly detailing ways to use such things as the subscripts and superscripts that are used for footnotes.

Dan Gilbert
New Orleans, LA


An accident has sent our time-traveling Adventurer back
to this place . . . back to . . .

The Land of the Cave Bear



By Leonard Hyre

Not long after I discovered how handy a computer can be, I stumbled through my first Adventure. When the quest was achieved (escaping from a derelict spaceship), the satisfaction I felt was immense. I was hooked from then on!

This Adventure, *The Land of the CAVE BEAR*, was written in hopes I could show some of my computing friends just what they were missing. I had in mind an Adventure that was unique and challenging, but at the same time it had to be fun. And more importantly, it had to be solvable in a reasonable amount of time, even for a novice.

As my collection of computers (my family's terminology!) grew, so did the rewrites and updates to *CAVE BEAR*. Now, with the Tandy 1000 on hand, I couldn't resist the upgrading of my old friend, the hapless Adventurer in *Land of the CAVE BEAR*.

CAVE BEAR takes place in the far distant past, 50,000 years B.C. The Neanderthal people populate the world, surrounded by strange and exotic beasts. An accident has sent our time traveling Adventurer back to this place. Your job is to stay alive and figure out how to get back to the present.

To solve the mystery, you guide the Adventurer with simple two-word commands, the first of which is a verb. For example, GET ROCK, GO SOUTH or COOK STEAK are all legal commands. The program will respond accordingly and appropriately (usually!). There are also a few single word commands, standard to most Adventures. An example is the word INVENTORY, to get a list of the items the Adventurer is carrying. Another is LOOK to get a description of the surroundings. All commands should be made in uppercase (caps key on), and two-word commands should be separated by a single space.

You may be interested in knowing how an Adventure works, or even may be contemplating

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writing one yourself. I have tried to interlace *CAVE BEAR* with sufficient REM statements to lead you through the main sections of the program. Additionally, let me explain some of the main routines in detail.

The program starts out with an immediate jump to the title screen (GOTO 1960), a subroutine which in effect is like a separate small program. The first instruction, CLEAR ,,,(32768) sets up enough work space for Screen 5 (medium-res with 16 colors). Using simple line and draw commands, a picture is drawn of a distant volcano. For dramatic effect, we see lightning strike with a distant crackle and roar. The name of the program and a credit to me (ego strokes) is given. To begin play, any key can be pressed. Until a key is pressed the program loops continuously through the striking lightning and thunder subroutine, Lines 2080 to 2210. Breaking out an earlier PCM and rereading Bill Barden's article on sound effects on the 1000, saved me much time here. Machine specific articles are invaluable as reference materials.

After a key is pressed the program proceeds to the "Scenario Screen." This sets up the events that lead up to the Adventure in time, telling the user what led to the accident and giving some clues as to how they (the users) may get back to the present. The scenario scene encompasses lines 2210-2340. Pressing any key here sends the traveler plunging into prehistoric terror. The traveler watches the years recede to a distant 50,000 years B.C. (lines 2380-2450).

Now, after our short diversion, the program proper begins execution with the RUN 140 command in Line 2450. At this time, we need to set up a bit of housekeeping, DIMensioning arrays and setting initializing values to various variables (lines 150 and 200).

When writing an Adventure, you must first decide on the events that will take place and, using them as a guide, draw a map of the rooms (locations) in the Adventure. You then place objects, some needed and some not, in those locations. Now, you are armed for creating the Adventure itself.

The program must be able to control all of the above. Thus we must now READ in all of the DATA needed. Lines 240-500 list all the data statements. Type them carefully; a mistake here will result in errors showing up later in the program, a difficult situation to resolve. The statements are read by lines 420-690. An example of this would be Line 560, which reads in the rooms (locations) as P$(C), the C ranging from 1 to 17. After reading them in, our program can identify locations by reference. The location C$(1) is "A SHADED HILLSIDE PEPPERED WITH BUSHY COVER," the first piece of data encountered by Line 560.

The next routine, at Line 600, gets the description of each object to be found, a short version of the same and an initial location for each of the objects. For example, the DATA for this routine is contained in lines 340-400; thus the first object description is "REMAINS OF THE TIMECRAFT CRASH" and will be found at location 1, the "SHADED HILLSIDE." The short object description makes it easier to manipulate an item, as in GET ROPE instead of "GET BRAIDED ROPE OF INTERWOVEN VINE."

Possible directions of travel are the subject of the next routine, found at lines 640-650. Numbers representing all possible exits from the 17 locations are read in here. Of course, some exits are temporarily or permanently blocked, as required for story flow.

The list of possible verbs is added next (Line 690), giving a control number for each, C(C). This allows the program to jump to the proper routine within the program once a verb is determined.

Finally, actual play begins at Line 730. The first lines check on remaining "Strength Level," check for special conditions, tell us where the Adventurer is, what he sees and asks for the next action. The ON A GOTO in Line 1070 sends the program off to the appropriate routine, based on the verb used.

The bulk of the program is made up of these individual routines. It is easy enough to follow through the logic. As an example, say the command is DROP ROPE, in which the verb "DROP" (4) sends the program to the fourth subroutine shown in the ON A GOTO; in other words, Line 1210. Here, a loop checks the user's input object (rope) against all known objects, and if a match is made, *and* the item is currently being carried (Location 1000), Line 1230 is executed and the object is dropped. If no match is made, Line 1250 explains "I don't have the rope."

A couple of tips may help you out. For directions of travel you can say GO SOU, GO NOR, GO EAS or GO WES. To see what you are carrying, type INV instead of INVENTORY. Most objects can be abbreviated by the first three letters of the word, an example being SAB for SABRETOOTH. One other thing . . . *watch your strength* — even time travelers must eat and drink!

If you wish to avoid typing in the program, remember, it will be available on PCM ON DISK or Delphi's GROUP MSDOS board for a small fee. Also, if you prefer, you can send me $8 and I will send you a copy on disk. My address is L.Hyre, P.O. Box 403, Cambridge, MD 21613. If you have any problems with *CAVE BEAR*, feel free to call me any evening after 5:00 p.m. EST at (301) 228-0064.

Tandy 1200 and 2000 Owners

The program, as written, is for the Model 1000. However, you should be able to create a working copy for either the Tandy 1200 or Tandy 2000 without much difficulty. The easiest way is to eliminate the title screen altogether by not typing in lines 1960 to 2200 and changing Line 100 to GOTO 2220. You may encounter other minor syntax problems, but nothing of a substantial nature. □

The listing:

```
1 '*****************************************
2 '*                                       *
3 '*      Land of the CAVE BEAR            *
4 '*                                       *
5 '*        (C)  L. Hyre 1985              *
6 '*                                       *
7 '*       FOR THE  TANDY 1ØØØ             *
8 '*                                       *
9 '*****************************************
```

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```
100 GOTO 1960
110 '
120 '***** GO DRAW TITLE SCREEN *****
130 '
140 DEFINT S
150 DIM P$(18),OB$(29),B$(29),B(29),C$(29),C(29),T(4,17),T$(4),LD(6)
160 '
170 '
180 '***** SET INITIAL VALUES AND LIST DATA STATEMENTS *****
190 '
200 CLS:ZW=1:S=100:WT=0:BK=0:NX=0:M=1:L=1:CI=1:LD=0
210 '
220 '***** LOCATION DESCRIPTIONS *****
230 '
240 DATA A SHADED HILLSIDE PEPPERED WITH BUSHY COVER,AN OPEN MEADOWLAND WHERE ST
RANGE HERBIVORES GRAZE PEACEFULLY. HERE ISTHE REST  OF THE CRASH REMAINS - COVER
ED BY ROCK AND DEBRIS! (IF ONLY YOU HAD  SOME DYNAMITE OR SOMETHING!)
250 DATA A STILL SMOKING VOLCANIC MOUNTAIN,A DIMLY LIT AND FOR-BODING WOODS. THE
RE'S NO SIGN OF LIFE AROUND.
260 DATA A FLINT OUTCROPPING ON A GRASSY KNOLL. THE FLINT SEEMS TO HAVE BEEN  WO
RKED!,A BUSY WATERHOLE
270 DATA A SWAMPY HOLLOW WHERE A HERD OF MASTODON PLAYFULLY WALLOW IN THE MUCK,A
 NEANDERTHAL CAMPSITE. THERE ARE SIGNS OF VERY RECENT USE.
280 DATA RIDGE OVERLOOKING A HUGE SABRE TOOTH LION FEEDING ON A FRESHLY KILLEDAN
TELOPE. A SOFT BREEZE BLOWS FROM THE EAST.,INSIDE A EERIE DARK CAVE ENTRANCE - A
 GROWL IS HEARD... ,A NEANDERTHAL CAVE - DAMP AND COOL.
290 DATA A TINY SECRET CHAMBER LIT BY TORCH. IT IS PAINTED WITH STRANGE BEASTSBO
TH REAL AND IMAGINED,A NARROW PATHWAY ALONG A DEEP CREVICE,A THICK AND TOTALLY U
NPENETRABLE FOREST. YOU WOULDN'T WANT TO LINGER HERE.
300 DATA AN EXPANSIVE MARSHY BOG,A MOSQUITO INFESTED SWAMPLAND,A LARGE PLAINS AR
EA- FAR TOO LARGE TO SET OUT ON.  A SULPHURIC CLOUD RISES FROM A FAR DISTANT VOL
CANO.
310 '
320 '***** OBJECT DESCRIPTIONS, OBJECTS, OBJECT LOCATION *****
330 '
340 DATA REMAINS OF THE TIMECRAFT CRASH,*,1,EMPTY CANTEEN,CANTEEN,1,THE CONTROL
PANEL,*,2,THE POWER CANISTER ---THE TIME  DILATION LOCATER MISSING!,*,2,FLASHLIG
HT,FLASHLIGHT,2
350 DATA HARDENED LAVA FLOW,*,3,CRUSTY SULPHUR DEPOSITS,SULPHUR,3,BUSHES LADEN W
ITH RED BERRIES,BERRIES,4,MENACING LOOKING CLUB,CLUB,4
360 DATA POTASSIUM NITRATE DEPOSIT,POTASSIUM NITRATE,4,FLAKED SPEARHEADS,SPEARHE
ADS,5,BRAIDED ROPE OF INTERWOVEN VINE,ROPE,5,OLD HOLLOWED OUT LOG,LOG,6,FRUIT TR
EES GROWING ALONG THE BANK. BABOONS ARE FEEDING ON THE FRUIT,FRUIT,6
370 DATA UGLY WARTHOG ROOTING UP THE EARTH,*,6,BRIGHTLY FEATHERED HOATZIN,*,14,M
ASTODON HERD,*,7,FIRE HARDENED SPEAR SHAFT,SHAFT,8,CHARCOAL EMBERS,CHARCOAL,8
380 DATA SABRE TOOTH LION,*,9,TASTY LOOKING ANTELOPE STEAKS,STEAKS,9
390 DATA CRAMPED NARROW PASSAGEWAY,*,11,YOUNG NEANDERTHAL WOMEN,*,11,A GNARLED O
LD MEDICINE MAN,*,11,A RING OF CAVE BEAR SKULLS,SKULLS,12,THE TIME DILATION LOCA
TER,LOCATER,12
400 DATA A DRIED ANIMAL SKIN,SKIN, 15,SMALL ROUNDED STONES,STONES,16,THOUSANDS O
F QUAGGA AND OTHER HERD ANIMALS,*,17
410 '
420 '***** EXITS FROM INDIVIDUAL LOCATIONS *****
430 '
440 DATA 0,4,2,0,0,5,0,1,0,-1,0,0,1,7,5,0,2,8,6,4,-1,0,14,5,4,16,8,0,5,15,9,7,0,
-3,10,8,17,0,0,9,10,0,13,9,13,0,0,0,0,12,0,11,0,0,0,6,8,0,0,16,7,0,15,0,0,10,0,0
450 '
460 '***** VERBS [ INCLUDING SINGLE WORD COMMANDS] *****
470 '
```

```
48Ø DATA INVENTORY,1,LOOK,2,VIEW,2,GET,3,TAKE,3,DROP,4,GO,5,KILL,6,HIT,6,ATTACK,
6,STAB,6
49Ø DATA EAT,7,DRINK,8,SWIM,9,MAKE,1Ø,BUILD,11,COOK,12,LIGHT,13,FLOAT,14,ROW,14,
FILL,15,HELP,16,CRY,17,YELL,18
5ØØ DATA SAY,19,LISTEN,2Ø,LIFT,21,WEAR,22
51Ø '
52Ø '***** READ IN THE DATA *****
53Ø '
54Ø '***** READ  IN  PLACES *****
55Ø '
56Ø FOR C=1  TO  17:READ P$(C):NEXT C
57Ø '
58Ø '***** READ IN DESCRIPTIVE OBJECTS,OBJECTS,LOCATION OF OBJECTS *****
59Ø '
6ØØ FOR C=1 TO 29:READ OB$(C),B$(C),B(C):NEXT C
61Ø '
62Ø '***** READ POSSIBLE EXITS FROM EACH LOCATION *****
63Ø '
64Ø FOR C=1 TO 17:READ T(1,C),T(2,C),T(3,C),T(4,C):NEXT C
65Ø T$(1)="NORTH":T$(2)="SOUTH":T$(3)="EAST":T$(4)="WEST"
66Ø '
67Ø '***** READ IN VERBS *****
68Ø '
69Ø FOR C=1 TO 28:READ C$(C),C(C):NEXT C
7ØØ '
71Ø '***** ACTUAL PLAY BEGINS HERE *****
72Ø '
73Ø CLS:RD=INT(RND(1)*9)+1:S=S-RD:IF S>1ØØ THEN S=1ØØ ELSE IF S=<Ø THEN 181Ø ELS
E 74Ø
74Ø CLS:WIDTH 8Ø:COLOR 2,Ø:LOCATE 1,1,Ø:PRINT"STRENGTH LEVEL IS NOW ";S;:LOCATE
2,1:PRINT STRING$(8Ø,"_");
75Ø IF CSRLIN>2Ø THEN GOSUB 192Ø
76Ø LOCATE 25,2Ø:COLOR 6,Ø:PRINT"The Land of the CAVE BEAR!..... by L. Hyre";:C
OLOR 2,Ø
77Ø LOCATE 4,1,1:PRINT"YOU ARE AT ";P$(L)
78Ø IF L=1Ø AND LEFT$(OB$(2Ø),3)="SAB"THEN B(2Ø)=1Ø
79Ø IF L=2 AND B(1Ø)=1ØØØ THEN B(1Ø)=2:B$(1Ø)="*":OB$(1Ø)="POTASIUM NITRATE":LD=
LD-1
8ØØ IF L=2 AND B(19)=1ØØØ THEN B(19)=2:B$(19)="*":LD=LD-1
81Ø IF L=2 AND B(7)=1ØØØ THEN B(7)=2:B$(7)="*":LD=LD-1
82Ø IF L=2 AND B(1Ø)=2 AND B(19)=2 AND B(7)=2 THEN B(1Ø)=Ø:B(19)=Ø:OB$(7)="EXPLO
SIVE"
83Ø IF L=2 AND B(26)=1ØØØ THEN B(26)=2:LD=LD-1
84Ø IF L=2 AND B(7)=2 AND B(26)=2 AND OB$(7)="EXPLOSIVE"THEN 178Ø
85Ø IF CI=1 AND L=1Ø AND LEFT$(B$(2Ø),2)="DE" THEN 185Ø
86Ø IF CI=2 THEN T(3,1Ø)=Ø
87Ø IF CSRLIN>2Ø THEN GOSUB 192Ø ELSE PRINT
88Ø PRINT"YOU SEE:"
89Ø FOR C=1 TO 29:IF B(C)=L THEN PRINT OB$(C);" "
9ØØ NEXT C
91Ø IF L=1Ø AND B(2Ø)=1Ø AND LEFT$(OB$(2Ø),3)="SAB" THEN 182Ø
92Ø IF CSRLIN>2Ø THEN GOSUB 192Ø ELSE PRINT
93Ø PRINT"FROM HERE YOU CAN GO:"
94Ø FOR C=1 TO 4:IF T(C,L)<>Ø THEN PRINT T$(C);" ";
95Ø NEXT
96Ø IF CSRLIN>2Ø THEN GOSUB 192Ø ELSE PRINT
97Ø PRINT"WHAT NOW";:INPUT ACT$
98Ø FOR C=1 TO LEN(ACT$):IF MID$(ACT$,C,1)=" "THEN VRB$=LEFT$(ACT$,C-1):W$=MID$(
ACT$,C+1,LEN(ACT$)-C):GOTO 1ØØØ ELSE NEXT
```

```
99Ø VRB$=ACT$
1ØØØ FOR C=1 TO 28
1Ø1Ø IF LEFT$(C$(C),3)=LEFT$(VRB$,3) THEN A=C(C):GOTO 1Ø7Ø
1Ø2Ø NEXT
1Ø3Ø PRINT:PRINT"UH?":GOTO 96Ø
1Ø4Ø '
1Ø5Ø '***** WHERE TO BRANCH AFTER DETERMINATION OF VERB *****
1Ø6Ø '
1Ø7Ø ON A GOTO 1Ø9Ø,113Ø,114Ø,121Ø,128Ø,137Ø,144Ø,151Ø,154Ø,156Ø,159Ø,16ØØ,161Ø,
163Ø,167Ø,169Ø,17ØØ,171Ø,172Ø,173Ø,174Ø,175Ø
1Ø8Ø IF L=2 AND B(26)=1ØØØ THEN OB$(26)="REPAIRED LOCATER":B$(26)="*":B(26)=Ø
1Ø9Ø IF CSRLIN>2Ø THEN GOSUB 192Ø
11ØØ PRINT"I AM CARRYING:"
111Ø FOR C=1 TO 29:IF B(C)=1ØØØ THEN PRINT B$(C)
112Ø NEXT:GOTO 96Ø
113Ø GOTO 73Ø
114Ø IF LD>4 THEN PRINT"I'M CARRYING TOO MUCH!"::GOTO 96Ø
115Ø FOR C=1 TO 28:IF LEFT$(W$,3)=LEFT$(B$(C),3) AND B(C)=L AND B$(C)<>"*"THEN B
(C)=1ØØØ:PRINT"I GOT THE ";B$(C);"!":LD=LD+1:GOTO 96Ø
116Ø NEXT C
117Ø IF LEFT$(W$,2)="SA"AND L=9 THEN PRINT"I GOT IT BUT I THINK IT WAS A  ..BIG
GG!!.. MISTAKE!":PRINT"IT'S EATING ME ALIVE!":FOR DL=1 TO 15:OUT &H38,DL+1Ø:NEXT
:FOR DL=1 TO 2ØØØ:NEXT:PRINT"I'M DEAD.....":END
118Ø IF LEFT$(W$,3)="WAR"AND L=6 AND ZW=1 THEN PRINT"I GOT ONE AND IT'S ONE UGLY
 SUCKER! I LET IT GO.":ZW=ZW+1:GOTO 96Ø
119Ø IF ZW=2 AND LEFT$(W$,3)="WAR"AND L=6 THEN PRINT"YOU LEARN SLOW-DON'T YOU? I
'M BEING GORED TO DEATH!":GOTO 96Ø
12ØØ PRINT"I CAN'T TAKE THAT!!":GOTO 96Ø
121Ø FOR C=1 TO 28
122Ø IF NX=1 AND L=9 AND LEFT$(W$,2)="SP"THEN NX=2:GOTO 126Ø
123Ø IF LEFT$(W$,3)=LEFT$(B$(C),3) AND B(C)=1ØØØ THEN B(C)=L:PRINT"I DROPPED IT!
":LD=LD-1:GOTO 96Ø
124Ø NEXT
125Ø PRINT"I DON'T HAVE THE ";W$:GOTO 96Ø
126Ø PRINT"YOUR SIGN OF PEACE IS RECOGNIZED":L=11::FOR D=1 TO 11ØØ:NEXT:NX=2:T(2
,9)=11:GOTO 73Ø
127Ø GOTO 96Ø
128Ø FOR C=1 TO 4:IF LEFT$(W$,2)=LEFT$(T$(C),2) THEN DR=C:GOTO 13ØØ
129Ø NEXT C:GOTO 136Ø
13ØØ IF T(DR,L)>Ø THEN L=T(DR,L):GOTO 132Ø
131Ø IF T(DR,L)=Ø THEN PRINT"CAN'T GO THAT WAY!":GOTO 96Ø
132Ø IF T(DR,L)=-1 THEN PRINT"A SLUGGISH RIVER BLOCKS THAT WAY":GOTO 96Ø
133Ø IF T(DR,L)=-3 AND LEFT$(OB$(2Ø),3)="SAB" THEN 182Ø
134Ø IF T(DR,L)=-2 THEN PRINT"A NEANDERTHAL CHIEF BRANDISHING A SPEAR BLOCKS YOU
 PATH!":NX=1:GOTO 96Ø
135Ø GOTO 73Ø
136Ø PRINT"USE A DIRECTION!":GOTO  96Ø
137Ø IF L<>9 THEN 138Ø ELSE IF L=9 AND LEFT$(W$,2)="SA"AND B(18)<>1ØØØ OR B$(18)
<>"SPEAR"THEN PRINT"I WISH I HAD A SPEAR BUT I'LL GIVE IT A TRY":FOR DL=1 TO 3ØØ
:NEXT:PRINT"I'M GOING TO BE A SNACK FOR THIS GUY!":PRINT"I'M DEAD..":END
138Ø IF LEFT$(W$,2)="BA"AND L=6 THEN PRINT"THEY'RE TOO CUTE FOR THAT!":GOTO 96Ø
139Ø IF LEFT$(W$,2)="SA"AND L=9 AND B$(18)="SPEAR"AND B(18)=1ØØØ THEN PRINT"OK..
..HERE GOES!":PRINT"I GOT'EM....I GOT'EM...!":FOR SW=1 TO 3ØØ:NEXT:OB$(2Ø)="DEAD
 SABRETOOTH":B$(2Ø)="DEAD SABRETOOTH":T(2,9)=-2:ELSE 141Ø
14ØØ IF LEFT$(B$(2Ø),3)="DEA"THEN P$(9)="A RIDGE OVERLOOKING A BLOODY FIELD.":GO
TO 96Ø
141Ø IF LEFT$(W$,2)="MA"AND L=7 THEN PRINT"NO WAY-FELLA! I MIGHT BE AN ADVENTURE
R BUT I'M NOT NUTS.":BEEP:GOTO 96Ø
142Ø IF L=9 AND LEFT$(W$,2)="CH" OR LEFT$(W$,3)="NEA"THEN PRINT"YOUR SPEAR PIERC
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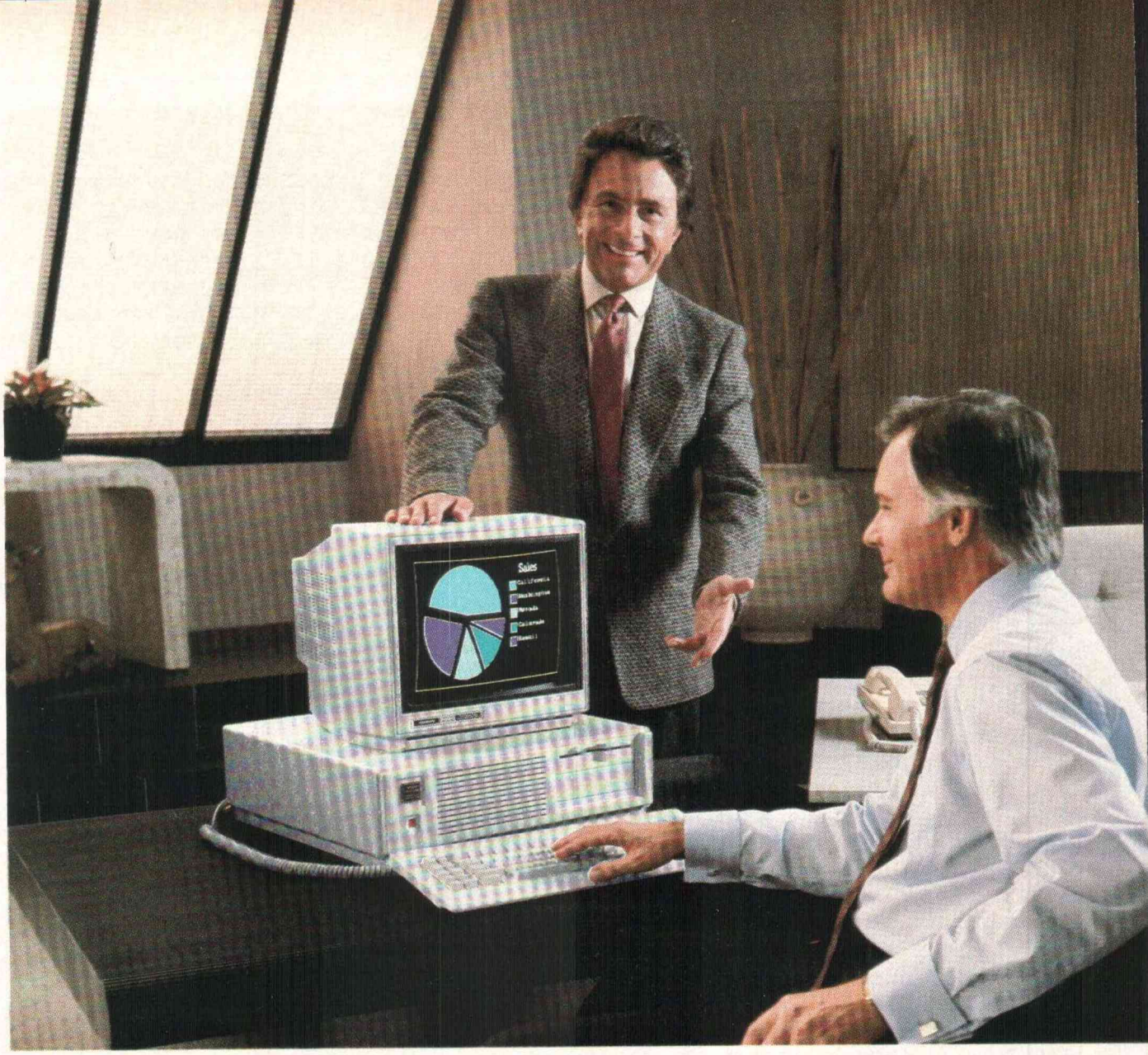
```
ES HIS CHEST! HE DIES-":FOR DL=1 TO 4ØØ:NEXT:PRINT"AND SO DO YOU. THIS MAN WAS Y
OUR DIRECT ANCESTER!":BEEP:END
143Ø PRINT"DON'T BE RIDICULOUS!":GOTO 96Ø
144Ø IF LEFT$(OB$(2Ø),3)<>"DEA"THEN 145Ø ELSE IF M=1 AND LEFT$(W$,3)="STE" OR LE
FT$(W$,3)="ANT"AND L=9 AND LEFT$(OB$(2Ø),3)="DEA"THEN PRINT"DELICIOUS! I REALLY
NEED THAT PROTEIN.":S=1ØØ:OB$(21)="ANTELOPE BONES":B$(21)="*":M=2:GOTO 96Ø
145Ø IF M=1 AND LEFT$(W$,3)="STE" AND L=9 AND LEFT$(OB$(2Ø),2)="SA" THEN PRINT"T
RY TO TAKE A SABRETOOTH'S DIN-DIN?  NO WAY..PAL!":FOR DL=1 TO 8ØØ:NEXT:GOTO 96Ø
146Ø IF L=4 AND LEFT$(W$,2)="BE"THEN PRINT"NOT BAD.......":FOR DL=1 TO 6ØØ:NEXT
:PRINT"KIND OF MAKES YOU WONDER WHY NO ANIMALS ARE EATING THEM!":FOR SW=1 TO 9ØØ
:NEXT:PRINT"I'M POISONED!!!!":FOR DL=1 TO 3ØØ:NEXT:END
147Ø IF LEFT$(W$,2)="FR"AND B(14)=1ØØØ THEN PRINT"BABOONS KNOW WHAT PLANTS TO EA
T.THESE ARE GREAT!":S=S+1Ø:OB$(14)="STRIPPED FRUIT TREES ALONG THE  BANK.BABOONS
 SIT LAZILY SUNNING THEMSELVES":B$(14)="SEEDS & PITS":B(14)=6:LD=LD-1:GOTO 96Ø
148Ø IF L=6 AND LEFT$(W$,2)="FR"AND B(14)=6 THEN PRINT"I CAN'T NOW!":GOTO 96Ø
149Ø IF L=9 AND M=2 AND LEFT$(W$,3)="STE"THEN PRINT"NOTHING LEFT THERE BUT VULTU
RES PICKING THE SKELETON!":S=S-5:T(2,9)=-2:GOTO 96Ø
15ØØ PRINT"I'M NOT EATING THAT!":GOTO 96Ø
151Ø IF B(2)=1ØØØ AND WT=1 AND LEFT$(W$,2)="WA"OR LEFT$(W$,2)="CA"THEN S=S+2Ø:PR
INT"AHH!  REFRESHING!":WT=Ø:OB$(2)="DRAINED CANTEEN":LD=LD-1:O(2)=L:GOTO 96Ø
152Ø IF LEFT$(W$,2)="WA"AND WT=1 AND B(2)<>1ØØØ THEN PRINT"I DON'T HAVE A CANTEE
N!":GOTO 96Ø
153Ø PRINT"THAT'S OUT OF THE QUESTION!":GOTO 96Ø
154Ø IF L=6 OR L=3 THEN CLS:PRINT"OK.I'M A GOOD SWIMMER,BUT I'M  NOT SURE SWIMM
ING IN AN UNKNOWN RIVER IS SMART.":FOR D=1 TO 16ØØ:NEXT:PRINT"SOMETIMES THERE A
RE CROCS IN THERIV..BLUB..BLUB..BLUB..!":END
155Ø PRINT"I CAN'T SWIM THAT!":GOTO 96Ø
156Ø IF B(11)=1ØØØ AND B(18)=1ØØØ AND LEFT$(W$,3)="SPE"THEN PRINT"I'VE GOT A GOO
D WEAPON NOW!":B(11)=Ø:B$(18)="SPEAR":B(18)=1ØØØ:FOR DL=1 TO 6ØØ:NEXT:B$(11)="*
":LD=LD-1:GOTO 73Ø
157Ø PRINT"I CAN'T MAKE A ";W$
158Ø GOTO 96Ø
159Ø PRINT"IF I TRIED TO BUILD THAT I WOULD PROBABLY ATTRACT THE WRONG KIND OF A
TTENTION!":GOTO 96Ø
16ØØ PRINT"THIS IS A MACHO ADVENTURE-------":FOR DL=1 TO 5ØØ:NEXT:PRINT"  EAT
 IT 'RAW'":GOTO 96Ø
161Ø IF B(5)=1ØØØ AND LEFT$(B$(18),2)="SP"AND B(18)=1ØØØ AND LEFT$(W$,2)="FL"AND
 L=1Ø THEN PRINT"A CAVE BEAR IS BLINDED BY THE LIGHT....JUST LONG ENOUGH FOR  Y
OU TO RUSH IN AND STAB IT.  YOU TAKE THE HEAD AS A TROPHY":BK=1:S=S+15:GOTO 9
6Ø
162Ø PRINT"I CAN'T LIGHT A ";W$:GOTO 96Ø
163Ø IF L=3 THEN 164Ø ELSE IF L=6 AND W$="LOG"OR W$="BOAT"THEN PRINT"YOU FLOAT A
CROSS THE RIVER. THE CROCODILES ARE UPSET THAT YOU DIDN'T SWIM!":L=3:B(13)=3:GOT
O 166Ø
164Ø IF L<>3 THEN 165Ø ELSE IF L=3 AND W$="LOG"OR W$="BOAT"THEN PRINT"YOU FLOAT
ACROSS THE RIVER.":L=6:B(13)=6:GOTO 166Ø
165Ø PRINT"YOU CAN'T FLOAT A ";W$:GOTO 96Ø
166Ø FOR DL=1 TO 1ØØØ:NEXT:GOTO 73Ø
167Ø IF L=6 AND B(2)=1ØØØ AND LEFT$(W$,2)="CA"THEN WT=1:B(2)=6:OB$(2)="FULL CANT
EEN":B$(2)="CANTEEN":PRINT"I FILLED IT....":GOTO 96Ø
168Ø PRINT"THAT'S SILLY!":GOTO 96Ø
169Ø PRINT"HELP - YOU SAY!....IT WASN'T MY IDEA TO COME HERE IN THE FIRST  PLACE
!!!!":GOTO 96Ø
17ØØ PRINT"SISSY!":GOTO 96Ø
171Ø PRINT"HELLOOOOOOOO.......!":BEEP:GOTO 96Ø
172Ø PRINT"I SAID '";W$;"'":PRINT"BUT NOTHING HAPPENED!":GOTO 96Ø
173Ø PRINT"I HEAR THE BIRDS SINGING IN THE TREES. BIG DEAL!":GOTO 96Ø
174Ø PRINT"SORRY, I'VE JUST HAD A HERNIA OPERATION!":GOTO 96Ø
175Ø IF LEFT$(W$,2)="SK"AND B(27)=1ØØØ THEN PRINT"I SURE LOOK SILLY IN THIS LITT
```



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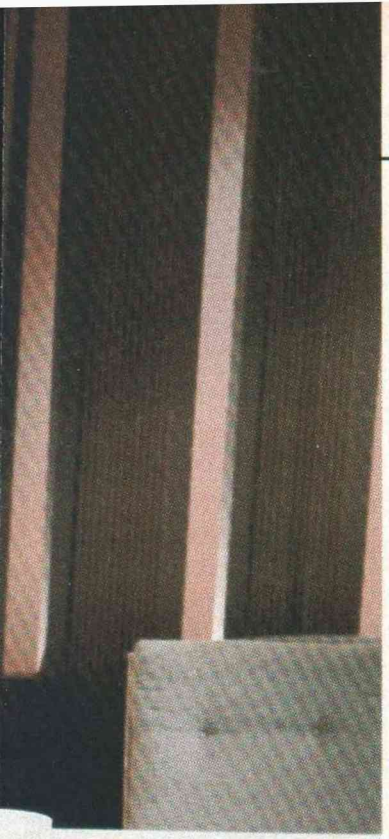

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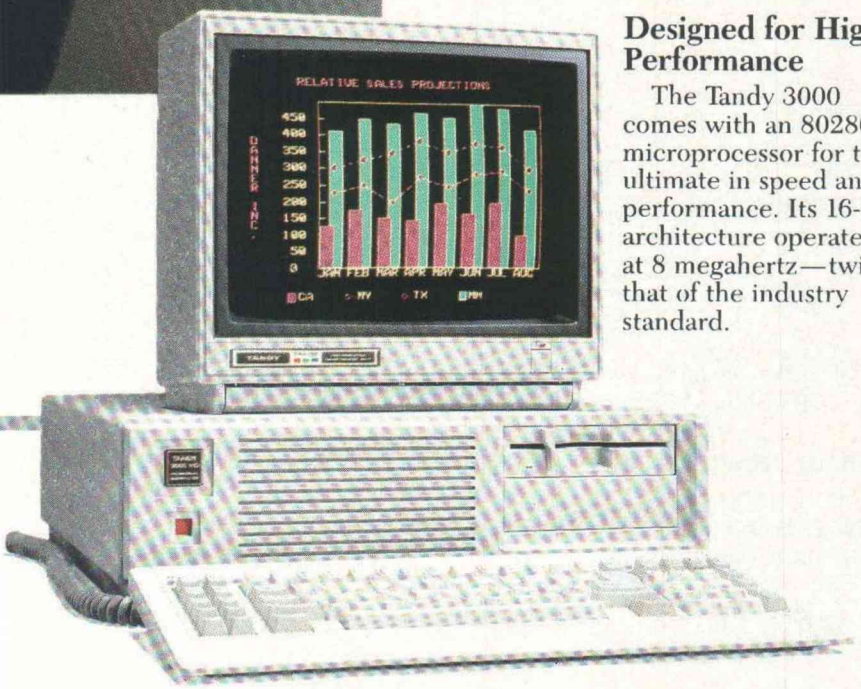

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The Tandy 3000 comes with an 80286 microprocessor for the ultimate in speed and performance. Its 16-bit architecture operates at 8 megahertz—twice that of the industry standard.

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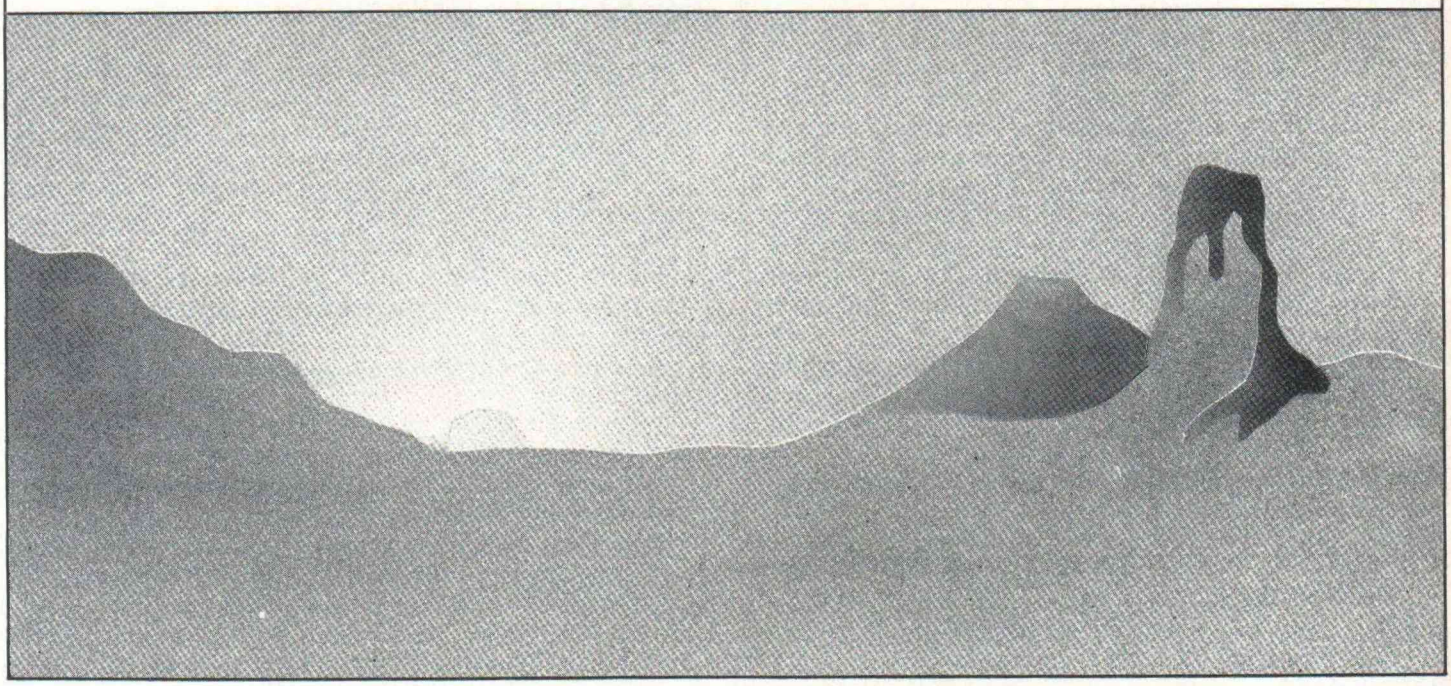
```
LE SQUIRREL SKIN":LD=LD-1:FOR DL=1 TO 6ØØ:NEXT:B(27)=Ø:GOTO 96Ø
176Ø IF LEFT$(W$,2)="SK"AND B(27)<>1ØØØ THEN PRINT"I DON'T HAVE THE SKIN":GOTO 9
6Ø
177Ø PRINT"WEAR WHAT????...NO WAY!":GOTO 96Ø
178Ø FOR DL=1 TO 12ØØ:NEXT:CLS:PRINT:PRINT"YOU QUICKLY MAKE A GUNPOWDER MIXWITH
THE CHEMICALS YOU HAVE GATHERED. YOU USE   IT TO BLAST AWAY THE ROCK DEBRIS. AFT
ER YOU INSTALL THE DILATION  CONTROL"
179Ø PRINT"THE TEAM OF RESEARCHERS IN THE 21ST CENTURY THEN LOCATE AND RESCUE YO
U.         YOU HAVE SURVIVED   'THE LAND OF THE CAVE BEAR'"
18ØØ PRINT"THE  END";:END
181Ø PRINT"YOUR STRENGTH DROPPED TO NOTHING AND YOU HAVE DIED!":PRINT"SUCH IS TH
E END OF A CARELESS ADVENTURER!":END
182Ø PRINT:PRINT"YIPE!! A SABRETOOTH LION....":FOR DL=1 TO 15ØØ:NEXT:PRINT"NEVER
 GO UPWIND OF A LIVE SABRETOOTH LION!":PRINT:FOR DL=1 TO 15ØØ:NEXT:PRINT"HE OBVI
OUSLY FOLLOWED YOU FROM THE SITE OF HIS KILL."
183Ø FOR DL=1 TO 15ØØ:NEXT::PRINT"HE POUNCES!!!!!!!!!!!!!!!!!!!!":FOR DL=1 TO 1
ØØØ:NEXT:PRINT"NOW YOU ARE HIS MAIN COURSE.....":PRINT"THE END!"
184Ø END
185Ø INPUT"WANNA GO FARTHER IN";AN$
186Ø IF LEFT$(AN$,1)="Y"THEN 187Ø ELSE 188Ø
187Ø IF B(5)=1ØØØ THEN CI=2:GOTO 96Ø ELSE IF B(5)<>1ØØØ THEN PRINT"I CAN'T SEE I
N THE DARK!":FOR DL=1 TO 1ØØØ:PRINT"A CAVE BEAR HAS ME IN IT'S ARMS!IT'S ALL OVE
R.....PLEASE.....BE MORE CAREFUL WITH YOUR NEXT HAPLESS  ADVENTURER!":END
188Ø PRINT"WHEW!!! I WAS AFRAID YOU MIGHT  TRY IT!":CI=2:L=1Ø:FOR DL=1 TO 1ØØØ:N
EXT::GOTO 73Ø
189Ø '
19ØØ '***** WIPE SCREEN CLEAN [LEAVE STRENGTH LEVEL] *****
191Ø '
192Ø FOR WIPE=4 TO 24:LOCATE WIPE,1:PRINT STRING$(8Ø," ");:NEXT:LOCATE 25,1:PRIN
T STRING$(79," ");:COLOR 6,Ø:LOCATE 25,2Ø:PRINT"The Land of the CAVE BEAR!.....
by L. Hyre";:COLOR 2,Ø:LOCATE 4,1:RETURN
193Ø '
194Ø '***** INITIAL TITLE SCREEN *****
195Ø '
196Ø CLEAR ,,,(32768!)
197Ø KEY OFF:SCREEN 5,1:LOCATE 1,1,Ø:CLS
198Ø LINE(Ø,6Ø)-(319,136),8,B:PAINT(2,62),8,8
199Ø LINE(Ø,136)-(319,149),6,BF
2ØØØ DRAW"BM1,135;C1ØR318u513h314L7H2L12H1G3H3L16H4L3G3L24G7H5L15H2F3H3L13H14L2Ø
G16L5G3H6L12G2H2L3G3H4L8G2L2G2L2H2L5G3H4L9G3L3H2L15G3H2L5G5L9G1L5H2L5D7"
2Ø1Ø PAINT(2,133),2,1Ø
2Ø2Ø CIRCLE(4Ø,75),8,14:PAINT(4Ø,75),14,14:CIRCLE(1ØØ,75),3,15,,,.5:CIRCLE(1Ø4,7
8),4,15,,,.8:CIRCLE(1Ø9,74),8,15,,,.35:CIRCLE(115,76),7,15,,,.4:PAINT(1ØØ,75),15
,15:PAINT(116,77),15,15
2Ø3Ø CIRCLE(24Ø,8Ø),4,15,,,.5:CIRCLE(244,83),4,15,,,.8:CIRCLE(25Ø,78),8,15,,,.35
:CIRCLE(255,82),7,15,,,.4:PAINT(24Ø,8Ø),15,15:PAINT(255,82),15,15:PAINT(25Ø,78),
8,15
2Ø4Ø LOCATE 3,16:COLOR 4:PRINT"Land Of The":LOCATE 5,13:COLOR 14:PRINT"C A V E
B E A R"
2Ø5Ø COLOR 15:LOCATE 21,16:PRINT"by L.Hyre
2Ø6Ø COLOR 2:LOCATE 23,1:PRINT"Press ENTER to Begin....."
2Ø7Ø LINE(5Ø,1Ø)-(275,44),14,B,&H5555
2Ø8Ø AK$=INKEY$
2Ø9Ø DRAW"BM1Ø9,8Ø;C14G5R4G6R4G5"
21ØØ IF INT(RND(9)*9)<7 THEN 213Ø
211Ø OUT &H61,&H6C:OUT &HCØ,&HEØ+1*4+Ø
212Ø FOR I=1 TO 15:OUT &HCØ,&HFØ+I:NEXT I
213Ø DRAW"bm1Ø9,8Ø;c8g5r4g6r4g5"
214Ø IF INT(RND(9)*9)<6 AND AK$=""THEN 2Ø8Ø
```

```
215Ø DRAW"BM245,85;C14G8R5G8R3G8":DRAW"BM25Ø,85;C14F6L7F9L5F8R4G8"
216Ø OUT &H61,&H6C:OUT &HCØ,&HEØ+1*4+Ø
217Ø FOR I=1 TO 15:OUT &HCØ,&HFØ+I:NEXT I
218Ø DRAW"BM245,85;C8G8R5G8R3G8":DRAW"BM25Ø,85;C8F6L7F9L5F8R4G8"
219Ø FOR X=1 TO 1ØØØ:NEXT
22ØØ IF AK$=""THEN 2Ø8Ø
221Ø '***** THE SCENARIO SCREEN *****
222Ø KEY OFF:SCREEN Ø,1:COLOR Ø,2:WIDTH 8Ø:CLS
223Ø LOCATE 1,1:PRINT"The SCENARIO"
224Ø LOCATE 3,1:PRINT"Year 2ØØØ...."
225Ø LOCATE 7,1:PRINT"I awake....Where am I?...Now, it begins to come back. I wa
s out backpacking in  the New Mexico desert when I chanced upon a strange machin
e. I approached it    cautiously. On the side, an inscription read...."
226Ø LOCATE 11,25:PRINT"NASA Time Shuttle EXPERIMENTAL":LOCATE 12,37:PRINT"DANGE
R"
227Ø LOCATE 14,1:PRINT"Suddenly, it began to make strange noises!"
228Ø LOCATE 15,1:PRINT"HUM..HUMM...HUMMM....HUMMMM.....HUMMMMM....."
229Ø LOCATE 16,1:PRINT"I tried to get away. Too late! Things are spinning and fa
ding to black!
23ØØ LOCATE 17,1:COLOR 9,Ø:PRINT STRING$(8Ø," ");" BUT...Why do I have a vision
of 'Strange Hairy Men' carrying away something ?  ";:COLOR Ø,2
231Ø LOCATE 19,1:PRINT STRING$(8Ø," ");
232Ø LOCATE 2Ø,2Ø:PRINT"[MEANWHILE....BACK AT NASA HEADQUARTERS!]
233Ø LOCATE 21,1:PRINT"The TIME/CONTROL team tries desperately for a TIME-DILATI
ON Fix on the hapless  and unsuspecting traveler. It is his only hope!"
234Ø LOCATE 24,1:PRINT"PRESS ANY KEY to plunge into time!";
235Ø '
236Ø '***** SHOW THE REAL TIME GAUGE *****
237Ø '
238Ø AK$=INKEY$:IF AK$=""THEN 238Ø ELSE COLOR 2,Ø:CLS
239Ø WIDTH 4Ø:COLOR 7,Ø:LOCATE 6,7:PRINT"Real Time Distortion Guage";
24ØØ FOR DG=2ØØØ TO (-48ØØØ!) STEP-25ØØ
241Ø LOCATE 4,17:PRINT DG;
242Ø FOR DL=1 TO 2ØØ:NEXT
243Ø NEXT DG
244Ø LOCATE 4,12:COLOR 4:PRINT"5ØØØØ yrs. BC";
245Ø FOR DL=1 TO 3ØØØ:NEXT:RUN 14Ø
```

PCM



Pack BASIC programs to conserve precious memory

Sardine

By Richard Ramella

It's axiomatic — no matter how much memory your portable has, there's never enough to carry around all the information you need.

Sardine is a Model 100 utility program which helps alleviate the problem. It works on systems of 8K and up. It's a BASIC program which packs other BASIC programs into less space. A program compressed by *Sardine* stores in about 25 percent less memory space than its unpacked version. More text and BASIC file material can be carried in the system. Also, packed programs run about six percent faster than unpacked versions.

A packer program like *Sardine* is especially worthy for a portable computer where memory is at a premium.

This utility works by removing spaces where legal, eliminating the second through last REM comments, and combining lines where permitted by program logic. Once set into motion, it does all these things automatically.

There are two ways to use *Sardine*. One reads an in-memory file and creates a new in-memory version. The other reads the in-memory file and sends the new version to cassette. Available memory determines which you should use, and I'll cover this later.

Let's learn how to make *Sardine* work. Start by typing the listing for *Sardine* and saving it on cassette tape as a file named SARD.BA. Save it in memory under the same name.

We will first convert one in-memory file to another in-memory packed version.

The program to be compressed should be saved on tape. Load it in command mode, then type SAVE "OLD.DO" and press ENTER. This makes a double change. It turns the BASIC listing into a text file and renames it as OLD.

Now type RUN "SARD" and press ENTER. A prompt asks 1) Tape or 2) Text file?. Press 2 and the ENTER key.

Sardine is now doing its job. A series of O's appears on the screen, followed by a series of X's. When the O and X lines are equal, these messages appear: Sardine has done its work and See file PACK for program. A screen message says whether the new version is on tape or in the system.

Now type RUN "PACK" and press ENTER. After the flashing WAIT message goes off, press the SHIFT and BREAK/PAUSE keys simultaneously to stop the run. Type KILL"PACK.DO" and press ENTER. Then type SAVE "FILE.BA" (with FILE standing for the name you want the program to have) and press ENTER.

The new packed version now exists as an in-memory BASIC file which can be run, edited and saved to tape. The file OLD.DO has been automatically killed and you have wiped out PACK.DO.

Sending a new packed version to cassette requires slightly different steps.

When SARD.BA and OLD.DO are safely in the computer, put a fresh tape in the tape recorder, position it past the leader, note the counter number, and depress the PLAY-RECORD buttons together.

Run SARD.BA and answer the beginning prompt with a 1, so it will pack the file onto the tape. When the program has run, rewind the tape to the start of the new file and press the PLAY button on the recorder. Press F8 to go to menu mode. Put the cursor over the word TEXT and press ENTER.

Richard Ramella is a former newspaper editor who now works as a writer for a California hospital. He has published more than 200 computer programs.

Type PACK and press ENTER. Press F2. Answer the Load from: prompt by typing PACK and pressing ENTER. When the material has loaded into the text file, press F8 to go to menu mode, then press ENTER to go to command mode. Type RUN "PACK" and press ENTER. As before, break into the run, type KILL "PACK.DO" and ENTER, then save the program as a BASIC listing, naming it at this point.

These two methods of using *Sardine* are given for the sake of efficiency, ease and avoiding memory mistakes.

In general, a file-to-file conversion requires the system have free bytes equal to about 85 percent of the bytes used to store the text file of the program to be converted, because a new slightly smaller file is created within the computer. In the file-to-cassette method, the in-memory file can use all but about 1,800 bytes of memory.

The following table conservatively estimates the largest number of bytes a conversion program may occupy in computers with different memories:

System	To Cassette File	To Text File
8K	2,594	1,297
16K	10,786	5,393
24K	18,978	9,489
32K	21,270	13,585

Exceeding these limits may produce an OM (out of memory) error message.

If you run *Sardine* and get an OS (out of string) error message, the program has failed to handle the large amount of string material generated in converting a very long program. To try again, increase the CLEAR 1600 in Line 110 to a higher number. This error is improbable, but since there's a scintilla of possibility, you should know the cure.

Do not edit a program to be shortened while it is in text file form.

If you wish REM to be retained, use the symbol apostrophe (') rather than REM.

The program will give incorrect results if you use the capital letters REM in a string. It will cut off all following material in that line.

Do not use open-ended quotes in the program to be shortened. If you do, material on the next line may be added as part of the quote, with incorrect results.

I've tested *Sardine* on numerous programs with good results. The test programs included Tandy software, listings from magazines and my own work. However, I can't give an ironclad guarantee *Sardine* will work universally. There are so many programming techniques and possible anomalies, it seems quite possible that somewhere there is a program that will stymie *Sardine*. In fact, I have found one — *Sardine* itself. It cannot be used to pack a version of itself, because the characters REM exist within quotes.

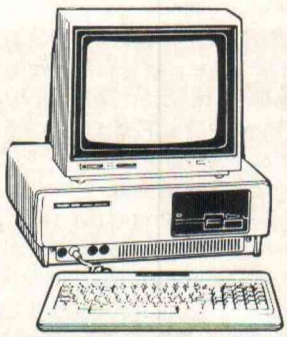
If anyone discovers other situations which thwart *Sardine*, a letter would be appreciated. Write to 1493 Moutain View Avenue, Chico, CA 95926. If you need a response, please include an SASE. □

PCM BAR CODED LISTING

The listing:

```
100 'Sardine/Model 100/Richard Ramella
110 CLS:MAXFILES=2:CLEAR1600:DEFSTRA-K:A
B="GOTO":AC="THEN":AD="ELSE":AE="GOSU":A
Z="RESU":D="OLD"
120 PRINT"1) Tape or 2) Text file?":INPU
T"Type 1 or 2, press enter";Q:IFQ<1ORQ>2
THENCLS:PRINTQ"illegal choice.":GOTO120E
LSEIFQ=1THENEE="CAS:PACK"ELSEEE="PACK"
130 OPENEEFOROUTPUTAS2:CLS:PRINT"Sardine
 working. Patience.":PRINT:OPENDFORINPUT
AS1
140 IFEOF(1)THEN210ELSELINEINPUT#1,E:PRI
NT"0";:FORZ=1TOLEN(E):AA=MID$(E,Z,4):IFA
A=ABORAA=ACORAA=ADORAA=AZORAA=AETHENM=4:
GOSUB160
150 NEXTZ:GOTO140
160 FORW=Z+M TOZ+M+7:IFLEN(K(S))>146THEN
S=S+1
170 H=MID$(E,W,1):IFH<>""THENR=ASC(H)
180 IFR>47ANDR<58THENG=G+H
190 IFH=","THENG=G+" ":Z=W:M=1:GOTO160
200 NEXTW:IFINSTR(K(S),G)>0THENG="":RETU
RNELSEK(S)=K(S)+" "+G:G="":RETURN
210 CLOSE1:PRINT:OPENDFORINPUTAS1
220 F="":IFEOF(1)THENPRINT#2,B:GOTO340
230 LINEINPUT#1,E:PRINT"X";:O=O+1:Y=INST
R(E,"REM"):YY=INSTR(E,"'"):IFO<2THEN240E
LSEIFY>0THENE=LEFT$(E,Y+2)ELSEIFYY>0ANDY
Y<8THENE=LEFT$(E,YY)
240 IFINSTR(E,"DATA")>0ORY>0ORYY>0ANDYY<
8THENPRINT#2,B:B="":PRINT #2,E:GOTO220
250 FORZ=1TOLEN(E):C=MID$(E,Z,1):IFC=CHR
$(34)THENL=L+1ELSEIFL=2THENL=0
260 IFL=1THENF=F+C:GOTO290ELSEIFC<>CHR$(
32)THEN280ELSEIFZ<40RZ=LEN(E)THEN270ELSE
P=ASC(MID$(E,Z-1,1)):V=ASC(MID$(E,Z+1,1)
):IFP>47ANDP<58THEN280
270 IFMID$(E,Z+1,2)="TO"ORMID$(E,Z+1,4)=
"STEP"ORMID$(E,Z+1,4)=ADTHENF=F+C:GOTO29
0
280 IFC<>CHR$(32)THENF=F+C
290 NEXTZ:FORV=1TO6:P=ASC(MID$(F,V,1)):I
FP<48ORP>57THEN300ELSENEXT
300 Q$=LEFT$(F,V-1):I=" "+Q$:FORT=0TOS:I
FK(T)=""THEN310ELSEIFB<>""ANDINSTR(K(T),
Q$)>0THENPRINT#2,B:B="":GOTO310ELSENEXTT
310 IFB=""THENB=F:GOTO330
320 J=RIGHT$(F,LEN(F)-(V-1)):IFLEN(B)+LE
N(J)<252THENB=B+":"+JELSEFRINT#2,B:B=F:G
OTO220
330 IFINSTR(B,"RETURN")>0ORINSTR(B,"END"
)>0ORINSTR(B,AB)>0ORINSTR(B,AC)>0THENPRI
NT#2,B:B="":GOTO220ELSE220
340 KILL"OLD.DO":CLOSE:PRINT:PRINT"See f
ile PACK for program.":IFQ=1THENPRINT"It
's on tape."ELSEPRINT"It's in the comput
er."
350 FORV=1TO10:BEEP:NEXTV:END
```

PERRY COMPUTERS



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DeskMate's help screens are nice, but they don't often go far enough. This month, Bobby shows you how to get more out of them

More Help!

By Bobby Ballard

If you've taken a look at the help files included with *DeskMate*, you've probably noticed the lack of in-depth help they provide. I'm going to show you how to make more of the help files in *DeskMate* by creating and editing your own files. In addition, you will be able to use the following information to add to the help files as we cover some of the more obscure aspects of *DeskMate* each month in the Integrated Desk. As you learn more about *DeskMate*, just use the following techniques to insert your notes right into your help files for easy future reference.

While we are going through the process of creating and editing your own help files, I will explain the use of EDLIN; the MS-DOS line editor found on your master MS-DOS diskette. So, if you haven't taken the opportunity to learn EDLIN techniques yet, this is it. Unless you bought the MS-DOS reference manual, you might have some unanswered questions concerning EDLIN and how to use it to the fullest.

On first glance, I thought that I would be able to edit the help files using the Text section of *DeskMate* and editing the help files would be one very simple process. I found this to be impossible because of the way the Text section saves its data. *DeskMate*'s Text section uses a non-standard format for storing its data that makes it incompatible with the way *DeskMate* reads its help files from the diskette. While the Text section can read MS-DOS text files, it saves them with a different format that changes the carriage returns and line feeds.

The process of creating your own personalized help files is still very simple using the EDLIN editor of MS-DOS. First, let me point out that you should use a backup copy of *DeskMate* for this exercise. If you run into any problems you won't destroy valuable files and information on your original or working copies. After you are finished editing, you may copy your new help files to your working copy and delete the old help files. You might even want to create and keep a separate disk or directory for your original and modified help files for future use.

The Basics

If you've been using *DeskMate* for any length of time, you probably know that the Text section can't recognize a text file unless the filename ends with .DOC as the extension. The same is true for the way *DeskMate* recognizes help files. Their filenames must end with .HLP as the extension. If you rename any of the *DeskMate* help files with the extension .DOC, they will show up in the Text section menu and you may read or

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print these files as any other text file. However, if you save any of these files back to diskette and rename them again using the .HLP extension, *DeskMate* will not be able to read the help file properly. The edited help files will write only to the top line of the screen, overwriting each previous line.

If you do a DIR command from MS-DOS on your *DeskMate* diskette, you will notice that there are nine help files that match the nine main sections of *DeskMate*. Look at Table 1 for a list of the help files and the corresponding section of *DeskMate* related to each file. Each of these files can be deleted, edited or increased.

To delete a help file while in *DeskMate*'s main menu, just press F9 and respond to the prompt at the bottom of the screen with the name of the help file you wish to delete. To edit or add information to one of the help files, read on.

Output Control

The method *DeskMate* uses to keep track of the help files while printing them to your screen involves the use of certain characters that pause output or signal the end of the file. While using a help file, you are given the option of pressing ENTER or F12 at the end of each screen. Note here that F12 is for the Tandy 1000 version of *DeskMate* and might be a different key on your system or version of *DeskMate*. By pressing ENTER, you continue to the next screen of information, providing there is one. Pressing F12 will take you back to the section you were in previous to invoking the help file.

When *DeskMate* finds a vertical line character (|), it pauses output and waits for a keystroke (either ENTER or F12). A backslash (\) tells *DeskMate* that it has reached the end of the help file and either ENTER or F12 will take you back to the section from which you called the help file. Anytime *DeskMate* finds either of these two characters in a line in a help file causes the above actions to be taken.

Now that you know how *DeskMate* controls help file output, you can create your own help files, including the number of screens, the content and the end of the file.

Editing

As I mentioned earlier, you can create or edit your help files using the line editor supplied on your MS-DOS

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diskette. However, you might be able to edit your help files using another word processor or editor that saves files in the standard MS-DOS format. If you have another word processor or editor available, try it and see if it works for you.

To test your word processor or editor, load one of the help files into the editor and re-save it under a different name. Then, from the MS-DOS command level, use the TYPE command to take a look at your saved file. If the file appears on the screen with line feeds in the correct places and you can read the data as text, your word processor or editor might just work. Some word processors have the ability to save text either in MS-DOS format or in its own specialized format.

If you think your word processor or editor might work, rename the edited file to its original name and make sure you keep the original help file under a different name in case something fails. Now start up *DeskMate*, enter the appropriate section and press ALT-1 to invoke the help file. If everything goes well, you should see your new help file on screen with pauses at each location you included a verticle line (|) and end where you placed the backslash (\) character.

EDLIN

If you don't have an alternative way of editing MS-DOS files, you can use EDLIN to do your help file editing. To use EDLIN, just type EDLIN followed by the name of the file you wish to edit and press ENTER. For example, to edit the TWME NU.HLP file, type EDLIN TWME NU.HLP and press ENTER. You must make sure that the file you wish to edit is on the same diskette as EDLIN or on a diskette in another drive or on your hard disk drive.

Once the line editor and file are loaded you will see a message explaining that the end of file has been reached. Now you may begin editing the help file to include any information you desire. You might want to delete some of the help file and replace the information with more specific information. In addition, you can reformat the data so that more help is presented on one screen at a time. Most of the help files, for example, are double spaced and require that you press ENTER several times to access all of the available data.

EDLIN will be a familiar way of editing if you've ever edited a BASIC listing or used any other line oriented

Table 1 ***DeskMate* Help Files**

TWTEXT.HLP	Text Section
TWWORK.HLP	Worksheet Section
TWFILER.HLP	Filer Section
TWTELCOM.HLP	Telecom Section
TWCALEND.HLP	Calendar Section
TWMAIL.HLP	Mail Section
TWALARM.HLP	Alarm Section
TWHOST.HLP	Host Section
TWMENU.HLP	Main Menu Section

editor. EDLIN, unlike a word processor, edits only one line at a time. Therefore, each command in EDLIN must be given in relation to a particular line number.

Once you have EDLIN and your file loaded, press L at the asterisk prompt (*) and press ENTER. You will see a listing of the first 23 lines of your file. Each line will have a line number assigned to it, yet, those numbers are not saved to diskette when you are finished editing. The numbers are for EDLIN's use only. Refer to your *MS-DOS Quick Reference Guide* or manual for a list of EDLIN commands and key functions.

Using the EDLIN commands and special key functions, you have the tools to create and edit your own help screens. It may not be as convenient as using *DeskMate*'s Text section or other word processor but it gets the job done.

Now let's take a look at one of the *DeskMate* help files and how it might be improved. Don't forget that not only can you change the text of your help files, you can also change the looks and format too. Figure 1 shows you the way TWALARM.HLP comes on the *DeskMate* disk and Figure 2 shows you some of the improvements you might wish to make to this same file. Figure 1 is also an example of how EDLIN would list TWALARM.HLP on your screen.

In Figure 1, the text is double-spaced and covers only the basics of the alarm section. In Figure 2, I've added some information that might not be as readily apparent as are the function key operations. This might or might not be the type of information you wish to keep in your help files; it's just an example of what you might do with a help file. You might also add information about the way you have your system set up or include notes about different directories. You might wish to improve the over-all look of the help screens with using asterisks, dashes, underlines and more.

Points to Remember

I want to give you several points to keep in mind as you edit and create your personalized help files.

First, always make sure your pages are no more than 23 lines long and each line is less that 80 characters long. Otherwise your pages will scroll up and you will not be able to read the top lines that have scrolled off the screen. Lines that are longer than 80 characters will affect the layout of the help screen.

Second, keep in mind that, if you have a one-drive system, the files you are going to be editing with EDLIN must be on the same diskette as EDLIN. If you have two drives, you can have the files on a separate disk as long as you include the drive specification when you invoke the line editor. For example, to edit a file on the second disk drive, type:

EDLIN B:*filename.ext*

This would load the line editor and then search and load your file from Drive B.

A one-drive system would use the command:

EDLIN *filename.ext*.

A third point to remember concerns the way EDLIN protects the files you are editing. When you use EDLIN, it creates a new file on your diskette using the same filename but with a new extension of .BAK. This becomes the backup file in case something goes wrong during editing. If disaster strikes, you can always go back, rename and use the old file. EDLIN will not load a file with the extension .BAK as a protection against destroying your original file. You must rename the file with a new extension. EDLIN will then load it and create a new backup file.

A final point to remember is not explained in the *MS-DOS Quick Reference Guide*. The insert mode of EDLIN will continue to add lines to your file with each press of the ENTER key. To escape the insert mode, you must use CTRL-C to send the break signal. Also, pressing the ESC key at the end of your file will place the backslash (\) into your text automatically.

Figure 1:

```
 1:*
 2:                Alarm
 3:
 4: To select a function, press appropriate function keys.
 5:
 6: [F6]  MERGE events from Calendar file into Alarm file.
 7:
 8: [F7]  SELECT beginning of event block, move marker to end of
 9:       desired block, then COPY or DELETE.
1Ø:
11: [F8]  COPY SELECTed events to copy buffer or to specifiedfile.
12:
13: [F9]  DELETE current event or SELECTed events from Alarm file.
14:
15: [F1Ø] ADD an event to Alarm.  Events automatically sortindate/
16:       time order.
17:
18: [F12] Return to Main Menu.
19:
2Ø: Special Note:  Alarm events displayed in upper right corner of
21: Main Menu for each day.  If Alarm is ON, events are automatically
22: deleted from Alarm file as their dates and times pass.
23: \
```

Figure 2:

```
Alarm

To select a function, press appropriate function keys.

[F6]  MERGE events from Calendar file into Alarm file.
[F7]  SELECT beginning of event block, move marker to end of
      desired block, then COPY or DELETE.
[F8]  COPY SELECTed events to copy buffer or to specified file.
[F9]  DELETE current event or SELECTed events from Alarm file.
[F1Ø] ADD an event to Alarm.  Events automatically sort in date/
      time order.
[F12] Return to Main Menu.

                        ** SPECIAL NOTES **

     You cannot turn the Alarm On while in the Alarm screen.  When
Alarm is ON the Main Menu has an "@" in the far upper right hand
corner of the screen next to the date and time.
     Alarm events displayed in upper right corner of DeskMate's
Main Menu for each day.  If Alarm is ON, events are automatically
deleted from Alarm file as their dates and times pass.
\
```

Put Away the Manuals

Now that you know how to create and edit your own *DeskMate* help files, you might never need to pull out the manuals again. If you find yourself repeatedly searching for manuals or magazine articles that have information concerning *DeskMate*, you won't have to now. Now you can add the information to your help files and stop your searching. As we cover more and more of the details of *DeskMate* here in PCM and the Integrated Desk, you will be able to put the information into your help files and always have it at your finger tips.

If you have any problems, questions or suggestions about this or any other aspect of *DeskMate*, don't hesitate to write me a letter or contact me on Delphi in the MSDOS group.

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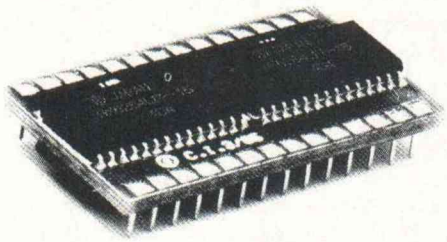

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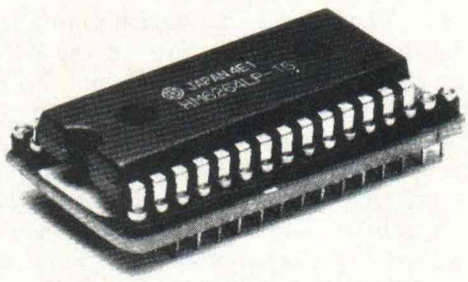

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'The' Gathering Place for Tandy Computer Users

By Kevin Nickols
MS-DOS SIG Manager

Many of you have already joined us on Delphi in PCM's MS-DOS SIG. At the first of this year, membership in the group was already above 1,200 with more than 100 users logging on each day.

Because of the rapid influx of new subscribers we helped bring to Delphi, there have been some problems getting manuals and command cards delivered in a timely manner. In an effort to offset this inconvenience to our readers, we are reproducing a modified version of the Delphi command card on the following two pages.

I have somewhat disappointing news for our members north of the border this month who access Delphi through the Canadian Datapac network. Datapac is a packet-switched network with a very complex rate schedule, levying charges for every kilocharacter of data transferred. They have an arrangement with the U.S. carriers, Tymnet and Uninet, who bill Delphi for the Datapac usage connected through their networks. Because of high charges Delphi is incurring through this arrangement, they have decided to raise their surcharge for Datapac connection from $3 to $12 an hour. With Delphi's own charge for service of $6 an hour, evenings and weekends, this brings the cost to $18 for the users who must access through the Datapac network (U.S. dollars, that is).

However, there are some alternatives and there will be more in the future. Tymnet has a node in Toronto and plans to add other major Canadian cities early in the year. Uninet also plans to add Canadian nodes to its network soon, with rates only slightly higher than for the U.S. Also, Bell Canada is apparently running a promotion called INET2000, offering service into Delphi at a round-the-clock rate of $16 an hour.

I would like to take a moment to mention the names of some people who have helped, in one way or another, get the MS-DOS SIG online and off to an impressive beginning. John Smithers, Bob McDonald, Bob Herring, Bob Jack, Bobby Ballard (lot's of Bobs!) and Leonard Hyre all deserve special thanks from me personally and all the rest of the group members.

Which brings me to a point that I'll direct to all the programmers among you: Even if you don't care to join the SIG, or simply don't have the time to take part, you can still share your programs with other Tandy users who would love to have them. Send them to PCM (on a disk), along with operating instructions, and clearly state that they are for use on the MS-DOS SIG rather than a submission to the magazine. I will post them in the group's databases and place your name in the display as the owner of the program.

Send your suggestions and comments to me by Delphi Mail: Username (NICKOLS). I'll be waiting to hear from you.

DELPHI™

This abbreviated, modified version of Delphi's command card has been created to help our readers who use Tandy® MS-DOS Computers get started quickly on PCM's new MSDOS SIG. It is being reproduced here for your convenience and can be removed, if you wish, and kept near your computer for easy reference.

WELCOME TO DELPHI

Most Delphi commands are self-explanatory. This card will serve as a handy backup reference.

Signing onto Delphi Directly

1. Dial (617)-576-0862.
2. When you have carrier, press [ENTER] once or twice.
3. At "USERNAME" type your membername and [ENTER].
4. At "PASSWORD" type your password and [ENTER].

How To Sign On Using Uninet

1. Dial your local Uninet number.
2. Hit [ENTER] [.] [ENTER] at the |x| or "L?" prompt.
3. Type DELPHI or GVC at the SERVICE prompt.
4. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using Tymnet

1. Dial your local Tymnet number.
2. When "PLEASE TYPE YOUR TERMINAL IDENTIFIER" appears, type A.
3. When "PLEASE LOG IN" appears, type DELPHI.
4. Then type your USERNAME and PASSWORD as outlined above.

How To Sign On Using Datapac (Canada)

1. Dial your local Datapac number.
2. Type [.] for 300 baud or [.] [.] for 1200 baud.
3. Type Set 2:1, 3:126 for full duplex allowing deletes.
4. Type p 1 3106, DELPHI; [ENTER] (Tymnet)
5. Then type your USERNAME and PASSWORD as outlined above.

To obtain your local access number you may call Tymnet at 800-336-0149 or Uninet at 800-821-5340. If you have problems at any time, call Delphi toll-free at 1-800-544-4005. (Mass. 617-491-3393)

Note: Most commands require only enough letters to be entered to make them unique. For example, to enter CONFERENCE from the Main Menu, simply type "C" and [ENTER]. Do not press [ENTER] after commands using the Control Keys. Most other commands require pressing [ENTER] to activate them.

Typing BYE from any prompt (except the MAIL prompt) will log you off of Delphi.

Typing [?] [ENTER] will generally display a full menu or provide help.

IMMEDIATE COMMANDS (Can be used at any time.)

/HELP — lists Immediate Commands.
/ECHO — turn on character echo.
/NOECHO — turn off character echo. (Used after setting terminal or Uninet or Tymnet node to produce echo.)
/EXIT — exit to next higher menu or command level.
/GAG — turn off incoming /PAGE or /SEND messages.
/LENGTH — shows current number of lines per page on your screen or sets new length.
/NOGAG — turn on incoming /PAGE or /SEND messages after using /GAG.
/PROMPT (1, 2, or 3) — 1=no menu, no explanation; 2=no menu, some explanation; 3=menu plus explanation.
/TIME — show current Eastern time and date.
/WHOIS (username) — shows profile of member (if available).
/WIDTH — shows current screen width format or sets new width.

DATABASE

DIRECTORY — display a directory of all files in the topic.
EXIT — exit database.
HELP — get help on database actions and commands.
READ — read a description of a file. (You must read the file before you download it.)
SEARCH — search a topic by keyword.
SET TOPIC — switch from one topic to another without leaving the database section.
SUBMIT — submit a file for inclusion in a topic. The file must be in your workspace.
WORKSPACE — enter your workspace area.

In order to access a file, you must first READ (filename). Once you have read a file, the following actions are available:

DESCRIPTION — displays the file's description again.
DISPLAY — display/list the file on your screen.
DOWNLOAD — use with the buffer capture method of downloading.
EXIT — return to the database prompt.
HELP — get help on commands and actions.
LIST — like display; list a file in an unformatted format.
NEXT — advance to the next group or file. ([ENTER] defaults to NEXT.)
XMODEM DOWNLOAD — download the file using the Xmodem protocol.

WORKSPACE

Workspace is an area for you to store files and messages of all types. This is where you must first upload a file before submitting it to a database. You can file forum messages for retrieval later. Mail messages can be stored here.

From the MSDOS SIG> prompt type DA, and pick a topic, then type WO to reach Workspace.

APPEND — append one file to another.
CATALOG — shows which files you have created.
COMMON — go to the Delphi Common work area.
CREATE — creates file and stores it in your area.
DELETE — deletes files you no longer need.
DOWNLOAD — download a file from Delphi to your disk.
EDIT — create and edit your own text files.
EXIT — return to Main Menu.
HELP — explanation of WORKSPACE commands.
HOME — return home to your private work area.
LIST — lists contents of any file in your catalog.
PUBLISH — submits your file for Delphi publication in Authors, Members Choice or Newsletters.
PURGE — delete all but current version of duplicate files.
UPLOAD — upload a file from your computer to Delphi.
XDOWNLOAD — download via XMODEM protocol.
XUPLOAD — upload via XMODEM protocol.

MSDOS SIG FORUM

ADD — start a new message thread with a different topic.
BACK — moves backwards within a thread.
DELETE — delete a message.
DIRECTORY — display a directory of messages.
EDIT — edit the current message.
EXIT — exit forum.
FILE — put a copy of a message in your workspace.
FOLLOW — follow a message thread. Read only the messages of a particular thread.
FORWARD — send a copy of a message by mail.
HELP — get help on forum actions and commands.
HIGH — set/show the high message number.
MAIL — take you directly to mail.
NEXT — read next message. ([ENTER] defaults to NEXT.)
READ — read a message. (Typing message number will read that message.)
REPLY — reply to a message.
TOPICS — set/show message topic.

CONFERENCE

EXIT — return to Main Menu.
JOIN (groupname) — join existing group or start new one.
NAME (newname) — change your name or "handle".
PAGE (username) — pages another user in the system.
SCHEDULE — transfer you to the Conference Schedule.
WHO — lists all current users and Conference groups.
Conference Immediate Commands (use while in Conf).
/ACCEPT — accept another's page from within current group.
/ANSWER — respond to or decline PAGE from another user.
/CANCEL — terminate a PAGE to another user.
/EXIT — like CONTROL-Z; gets you out of wherever you are.
/GAG — disable /SEND's from people outside your conference group.*

/GLOCK — lock the group's attributes.*
/GNAME (newname) — change current group name.
/GPASS (password) — select a group password.*
/GPRIVATE — make the group private.*
/GQUIET — makes the group have silent entry and exit.*
/HELP — get help on conference actions and commands.*
/JOIN (groupname) — join an existing group.
/LOG — save a transcript of your conference in your workspace.*
/MAIL — takes you directly to Mail.
/NAME — create a conference nickname (handle).
/PAGE — ask another user to join your group.
/PASS (password) — say the password for admittance into password groups.
/REJECT — a pleasant "No thank you" to whomever is paging.
/REPEAT — turns Echo on or off.*
/RNAME (nickname) — show the username of a person using a handle.
/SCHEDULE — transfer you to the Conference Schedule.
/SEND (username) — send message to current user.
/SQUELCH (username) — ignore messages from a user.*
/TALK — like /JOIN, but doesn't leave current group. /# also works, where # is the number of a conference group. Allows you to participate in more than one group at the same time.
/WHO — lists all current users and Conference groups.
/WHOIS (username) — displays (username) Profile.

*Note: Many of these commands may be preceded by NO. For example, /GAG disables sends, but /NOGAG resumes them.

DELPHI MAIL

Primary Mail Menu (DMAIL)
CATALOG — lists all Mail files you have created.
EXIT — return to Main Menu.
HELP — explanation of Mail commands.
MAIL — send or read mail. Enters Secondary Mail Menu.
SCAN — display the headers for all unread mail.

Secondary Mail Menu (MAIL)
[ENTER] — depressing the return or carriage return key, will read the next message or more of the current message.
BACK — displays previous message.
DELETE — deletes current (last read) message.
DIRECTORY — lists summary of your mail messages.
DIRECTORY / Folder — lists folder names.
DIRECTORY (folder name) — lists summary of messages in the specified folder. For instance, DIR Pending.
EXIT — returns to Main Menu.
EXTRACT (filename) — adds current message to named file.
FILE (folder name) — adds current message to the named folder.
FORWARD — forward present message to others.
NEXT — skips to next Mail message. ([ENTER] defaults to NEXT.)
READ — displays your Mail messages.
READ (folder name) — reads contents of named Mail folder.
READ (n) — allows you to read selected message number.
READ /NEW — for new MAIL arriving while in MAIL.

REPLY — sends a reply to sender of current message.
SEARCH (string) — searches current Mail file for specified character string.
SELECT — pick messages for delete operation.
SEND — sends message to another user or users.
SEND (filename) — sends file (filename) to other user(s).
SEND/EDIT — calls editor to edit message being sent.
SEND/LAST — uses last message as text for current message.

HELP

Contains a full description of all Delphi services using the same structure as the Delphi Menus.

PEOPLE ON DELPHI

Enter information about yourself; find out about others.
I-AM — add or change information about yourself.
ADD — adds to existing information.
CHANGE — removes all current information about you and request new info.
DELETE — deletes all information under a given keyword heading.
DISPLAY — prints your personal profile.
EXIT — returns to Main Menu.
WHOIS (membername) — displays member profile if available.
SEARCH — find members with particular interests.
BROWSE — browse through member profiles.
LIST-KEYWORDS — shows keywords used in member profiles.

This section is accessed from the Delphi Main Menu. When someone does a /W command in conference, this is the information that will be displayed about a member.

USING-DELPHI

ADVICE FROM DELPHI — answers to most frequently asked questions.
CREDIT POLICY — explanation of current DELPHI policy.
GUIDED-TOUR — a brief version of the tour you took at signon.
MAIL TO SERVICE — send comments and suggestions to DELPHI.
NETWORK-INFO — phone numbers and login procedures for data networks.
PREMIUM-SERVICES — information concerning the extra cost services.
RATES-AND-PRICES — official Delphi rates and prices.
SETUP — terminal and network configuration.
LENGTH — lets you find your screen length and tailor Delphi accordingly.
MENU — choose default menu at sign-on.
PASSWORD — change your password. (frequent changes are recommended.)
PROMPT — select level of menu prompting desired.
SET-TYMNET — experiment with setting network parameters.
TERMINAL — special features for DEC VT100 and VT52 users.
WIDTH — tailor Delphi to fit your screen width.
USAGE-HISTORY — view your to-date activities on Delphi.

DELPHI TERMINAL CONFIGURATION GUIDE

8 bit ASCII*
1 stop bit*
no parity*
asynchronous
full-duplex
no auto-linefeed or carriage-return linefeed
XON-XOFF or Handshaking should be enabled

*sometimes you have to experiment with other combinations such as: (7 bit, 1 stop, noparity) or (8 bit, 1 stop, even or odd parity).

NOTES

To erase a character, Delphi uses the ASCII delete/rubout key which is decimal 127. If necessary, the terminal program should translate the backspace key to a delete/rubout. Unfortunately the networks do not echo the delete/rubout correctly however it will have the desired effect.

Delphi uses the following control characters:

CONTROL-Z — end of input or exit to next higher menu.
CONTROL-S — suspends sending.
CONTROL-Q — resumes sending.
CONTROL-O — skips to end of file or message.
CONTROL-U — cancels input for current line.
CONTROL-R — redisplays current line.
CONTROL-X — cancels everything typed ahead but unsent.
CONTROL-C — cancel current activity and start over.

If a particular control key is causing the terminal program to take some other action, then the terminal program should be reconfigured to use any of the other available control keys in place of the one required by Delphi.

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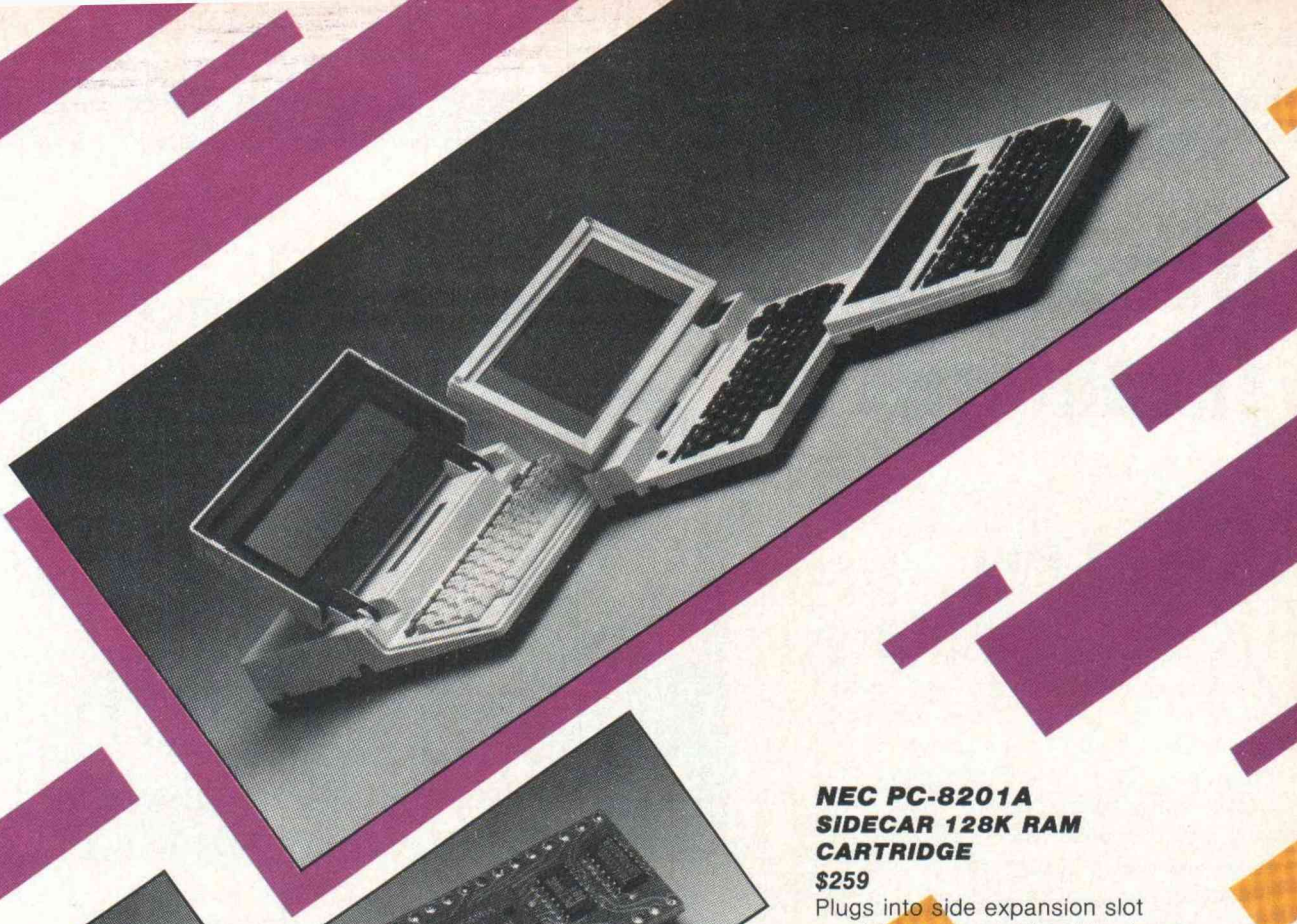

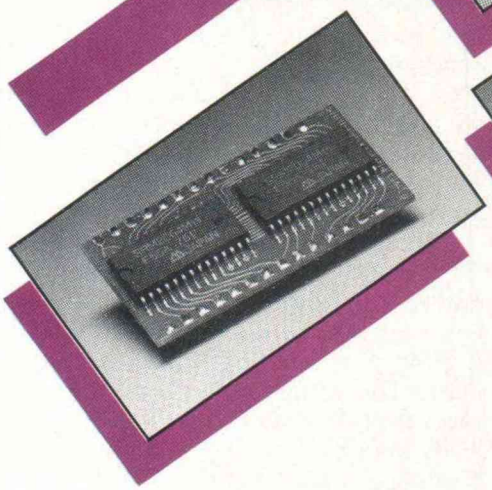

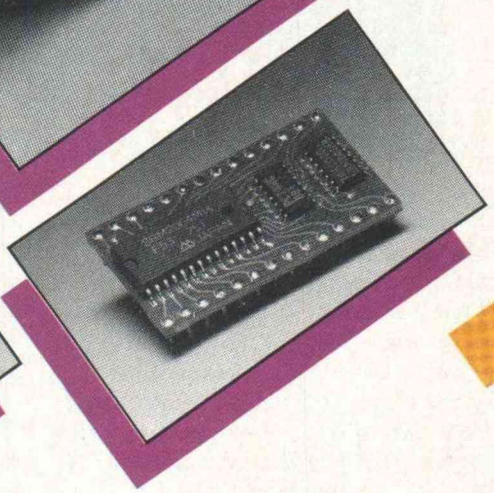

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FOOLISH TO PAY MORE — DANGEROUS TO PAY LESS

Household Inventory

Protect your investment in case of fire or theft with this BASIC program

By Elsner H. Baade

A recent boating accident resulted in the loss of considerable and expensive equipment. Fortunately, on the advice of my insurance agent, I had made an inventory of this equipment, put it into the computer and provided him with a copy for placement with my insurance file. In response to my claim, the adjuster simply verified the actual items lost and the settlement was quickly and fairly made.

The *Household Inventory* program is a simple program written in Tandy 1200 BASIC and should work on any of Tandy's MS-DOS computers. It provides an easy way to keep a complete, room-by-room inventory showing the description, date of purchase and cost or value of each item. The printer control codes used are for the DMP-2100 printer but may easily be adjusted to accommodate other printers.

Household Inventory is an easy-to-use, menu-driven program with simple user responses throughout. The program loads in BASIC under the abreviated name of HOUSE. When first run, the program presents a short title screen followed by the main menu which offers four options: 1) Initialize File, 2) Add to Data File, 3) Correct Data File and 4) Print Data.

Begin by selecting Option 1, Initialize File and press ENTER. This is followed by the question, "do you want to initialize the ownership file?". Actually, as indicated in the listing, lines 30 through 160, there are two random access files in the program. The first is the ownership file which stores the name of the person who owns the property and the address. The other file stores the household inventory. Since you are just starting, respond with Y. The program allows for either upper- or lowercase responses. Now, simply enter your responses to the questions. After entering the state, you will have the option of correcting the full entry by entering it again. A Y response will close the file and continue the program.

Answer Y to the question, "do you want to initialize the household furnishings?". At this point, it is simply a matter of responding to the questions. After the fourth response, you are again given the opportunity to correct your entry by entering it again or continuing to the next item by responding with Y or N. Please note that the date purchased must be filled. If in doubt as to when an item was purchased, simply fill in the month and day with zeros and guess the year as closely as possible. For example: 00/00/62.

It is not necessary that household items be entered in any orderly fashion. That is, you may enter an item located in the garage, the next located in the third bedroom and the next located in the living room. The program will sort these and print them under the proper location heading. In practice, however, it is best, when initializing the file, to list all the items in a given room. Then move to the next room.

You may end entries to the file and close it by responding N to the question, "do you have more entries?". Or, if you desire to quit the program at this point press CTRL-BREAK together. The files are automatically saved when they are closed but, if you haven't saved the BASIC HOUSE program after typing it in, do it now.

Assuming you are again back at the main menu, you now have the other options. If you have completed the inventory input, you will probably want to print it by selecting Option 4, Print Data. The program cautions you to check the printer and press ENTER when ready to print. I use standard 9½ by 11 continuous, blank paper.

The printout will show you the record number of each item. Thus, if you want to correct any item, you can easily and quickly do so. Select Option 3, "Correct Data File" and in response to the question, "what record number do you want to correct?" enter the appropriate record number. There are several responses built into the program. The first is to ask if you want to delete the data. If the answer is Y the question is "are you sure?". A Y answer causes all the data in the record to be deleted and you are advised of that fact on the screen. If you have more corrections, the program continues. If you enter a record number which has previously been deleted, the program will respond and continue. An entry of a record number which is greater than the end-of-file will also be noted. An N response to the correction question will take you back

---

Elsner Baade is retired and is a self-taught programmer. He currently maintains and runs mailing lists for several local service organizations and has developed the computer programs for the local Meals On Wheels office.

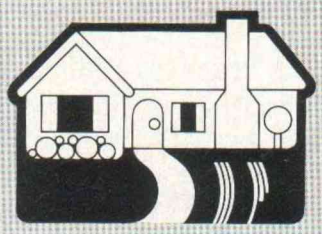
to the main menu.

Adding to the data file is accomplished by selecting Option 2, "Add To Data File." When Option 2 is selected, the program follows the same routines as used to initialize the file except the additional data records are added consecutively to the previous highest record number.

Essentially, that's how the program works. You should find that the locations given are adequate for the average three-bedroom house. If you need more or less, it's a simple matter to change, add or delete. Location information is programmed in lines 620 to 730, lines 1100 to 1220, lines 1790 to 1910 and lines 2030 to 2140. Any changes, additions or deletions should be made in each of these areas. I particularly draw your attention to Line 1790. The number used in this DIM D1$( ) must be equal to the highest D1$( ). Also, in Line 1930, the M figure must be changed correspondingly.

In developing the program, I arbitrarily established 500 as the number of records in the file. Refer to Line 1930 (N = 500). If you find you need more, just increase this accordingly. □

The listing:



```
10 ' ******      Household Inventory Program   ********
20 '
30 '             Variables Used - Owners File
40 '                  "OWNER" - Random Access File  (90)
50 '                   NF$ = Person(s) Name  (30)
60 '                   AF$ = Address of Property  (30)
70 '                   CYF$ = City  (15)
80 '                   R$ = User Response
90 '
100 '              Variables Used - Property inventory
110 '                   "POSSN" - Random Access File   (50)
120 '                   AF$ = Description of Property  (30)
130 '                   BF$ = Location of Property   (2)
140 '                   CF$ = Date of Purchase   (8)
150 '                   DF$ = Cost or Value   (10)
160 '                   R$ = User Response
170 '
180 '
190 GOSUB 2300
200 CLS
210 COLOR 15,1,14 : CLS
220 LOCATE 3,40: PRINT "Menu"
230 LOCATE 5,30: PRINT "1 = To Initialize File"
240 LOCATE ,30: PRINT "2 = To Add To Data File"
250 LOCATE ,30: PRINT "3 = To Correct Data File"
260 LOCATE ,30: PRINT "4 = To Print Data"
270 LOCATE 10,30: BEEP: INPUT "Enter Number of Selection   ",SELECTION
280 ON SELECTION GOTO 290,1230,1270,1640
290 CLS : LOCATE 5,10: PRINT "You have chosen to initialize the file ": LOCATE 7
,10: PRINT "Do you wish to initialize the ownership file ? ": LOCATE ,10: INPUT
"(Y or N)  ",R$
300 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN GOTO 520
310 IF LEFT$(R$,1) = "Y" OR LEFT$(R$,1) = "y" THEN GOTO 320 ELSE BEEP: BEEP: GOT
O 290
320 CLS: GOSUB 2270
330 R = 1
340 LOCATE 3,10: BEEP: INPUT "Enter person(s) owning the property  ",N$
350 CLS: LOCATE 3,10: BEEP: INPUT "Enter street address where property is locate
d  ",A$
360 CLS:LOCATE 3,10: BEEP: INPUT "Enter City where property is located  ",CY$
370 CLS:LOCATE 3,10: BEEP: INPUT "Enter State where property is located   ",S$
380 CLS: LOCATE 5,20: PRINT N$
390 LOCATE ,20: PRINT A$
400 LOCATE ,20: PRINT CY$
410 LOCATE ,20: PRINT S$
420 LOCATE 10,20: BEEP: INPUT "Is this correct ?  ",R$
430 IF R$ = "N" OR R$ = "n" THEN GOTO 340
```

```
44Ø LSET NF$ = N$
45Ø LSET AF$ = A$
46Ø LSET CYF$ = CY$
47Ø LSET SF$ = S$
48Ø PUT #1,R : CLOSE #1 : CLS: LOCATE 1Ø,2Ø: PRINT "File closed"
49Ø LOCATE 12,2Ø: BEEP: PRINT "Do you want to initialize the household furnishin
gs ?"
5ØØ LOCATE ,2Ø: INPUT "(Y or N )  ",R$
51Ø IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS: GOTO 22Ø
52Ø CLS: LOCATE 5,1Ø: PRINT "You have selected to initialize the inventory file"
53Ø GOSUB 1Ø6Ø
54Ø R = Ø
55Ø R = R + 1
56Ø LOCATE 7,1Ø: BEEP: INPUT "Enter Description of Item   ",I$
57Ø IF I$ = "" THEN BEEP: GOTO 56Ø
58Ø IF LEN(I$) > 3Ø THEN BEEP: BEEP: LOCATE 9,1Ø: PRINT "Too Long - 3Ø Maximum":
 GOTO 56Ø
59Ø IF LEN(I$) < 3Ø THEN I$ = I$ + " ": GOTO 59Ø
6ØØ CLS
61Ø LOCATE 3,1Ø: PRINT "What is the location of Item ?"
62Ø LOCATE 5,14: PRINT "1 = Garage"
63Ø LOCATE ,14: PRINT "2 = Kitchen"
64Ø LOCATE ,14: PRINT "3 = Dinnette Area"
65Ø LOCATE ,14: PRINT "4 = Dining Room"
66Ø LOCATE ,14: PRINT "5 = Family Room"
67Ø LOCATE ,14: PRINT "6 = Living Room"
68Ø LOCATE ,14: PRINT "7 = Master BR/Bath"
69Ø LOCATE ,14: PRINT "8 = # 2 BR/Bath"
```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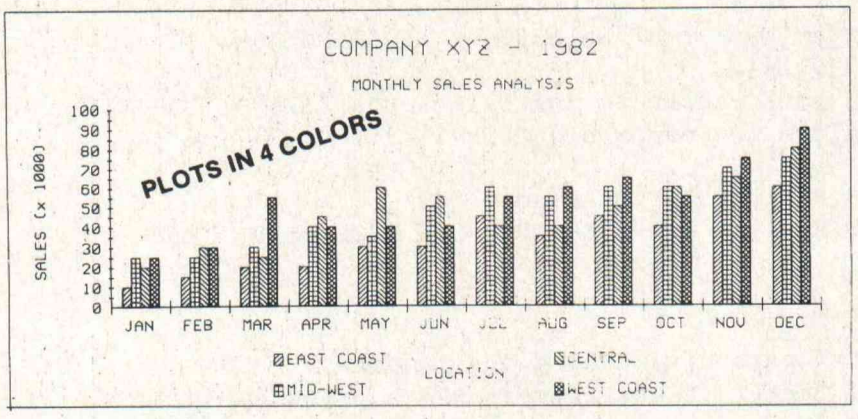

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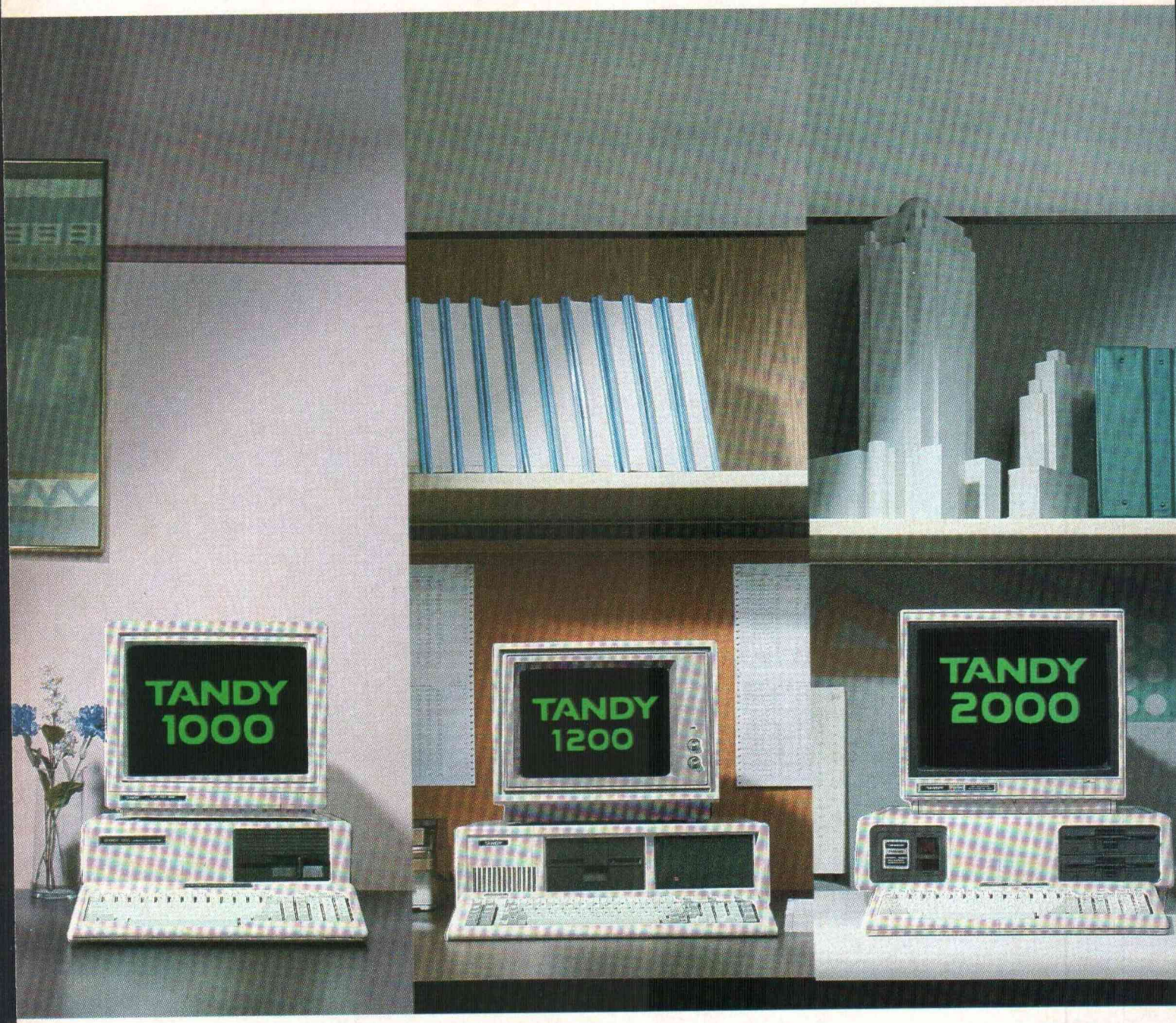
```
700 LOCATE ,14: PRINT "9 = # 3 BR/Bath"
710 LOCATE ,14: PRINT "10 = Basement"
720 LOCATE ,14: PRINT "11 = Patio"
730 LOCATE ,14: PRINT "12 = Yard"
740 PRINT: LOCATE ,10: INPUT "Select number and <ENTER>   ",L$
750 IF L$ = "" THEN 740
760 IF LEN(L$) > 2 THEN BEEP : BEEP: LOCATE 18,10: PRINT "Too long - max 2 - re-
enter": GOTO 610
770 IF LEN(L$) < 2 THEN L$ = L$ + " ": GOTO 770
780 CLS
790 LOCATE 5,10: INPUT "Enter Date Purchased (mm/dd/yy)  ",D$
800 IF D$ = "" THEN 790
810 IF LEN(D$) <> 8 THEN BEEP: CLS: LOCATE 3,10: PRINT "Re-enter": GOTO 790
820 CLS
830 LOCATE 5,10: INPUT "Enter cost of item (dollars & cents)   ",C$
840 IF C$ = "" THEN 830
850 IF LEN(C$) > 10 THEN BEEP: CLS : LOCATE  3,10: PRINT "Re-enter": GOTO 830
860 IF LEN(C$) < 10 THEN C$ = C$ + " ": GOTO 860
870 CLS
880 LOCATE 5,10: PRINT I$
890 GOSUB 1090
900 LOCATE ,10: PRINT D$
910 LOCATE ,10: PRINT C$
920 LOCATE 10,10: INPUT "Is this correct ?  ",R$
930 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS: GOTO 560
940 LSET AF$ = I$
950 LSET BF$ = L$
960 LSET CF$ = D$
970 LSET DF$ = C$
980 PUT #1,R
990 CLS
1000 LOCATE 5,10: INPUT "Do you have more entries ?  ",R$
1010 IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN GOTO 1040
1020 CLS
1030 GOTO 550
1040 CLOSE #1: CLS: LOCATE 5,10: PRINT "File closed"
1050 LOCATE 7,10: INPUT "Press <ENTER> to return to menu  ",R$ : CLS: GOTO 220
1060 OPEN "R",#1,"POSSN",50
1070 FIELD #1,30 AS AF$,2 AS BF$,8 AS CF$,10 AS DF$
1080 RETURN
1090 X = VAL(L$)
1100 IF X = 1 THEN LOCATE 6,10: PRINT "Garage": RETURN
1110 IF X = 2 THEN LOCATE ,10: PRINT "Kitchen": RETURN
1120 IF X = 3 THEN LOCATE ,10: PRINT "Dinnette Area": RETURN
1130 IF X = 4 THEN LOCATE ,10: PRINT "Dining Room": RETURN
1140 IF X = 5 THEN LOCATE ,10: PRINT "Family Room": RETURN
1150 IF X = 6 THEN LOCATE ,10: PRINT "Living Room": RETURN
1160 IF X = 7 THEN LOCATE ,10: PRINT "Master BR/Bath": RETURN
1170 IF X = 8 THEN LOCATE ,10: PRINT "# 2 BR/Bath": RETURN
1180 IF X = 9 THEN LOCATE ,10: PRINT "# 3 BR/Bath": RETURN
1190 IF X = 9 THEN LOCATE ,10: PRINT "# 3 BR/Bath": RETURN
1200 IF X = 10 THEN LOCATE ,10: PRINT "Basement": RETURN
1210 IF X = 11 THEN LOCATE ,10: PRINT "Patio": RETURN
1220 IF X = 12 THEN LOCATE ,10: PRINT "Yard": RETURN
1230 CLS: GOSUB 1060
1240 R = (LOF(1)/50) + 1
1250 GET #1,R
1260 GOTO 560
1270 GOSUB 1060
```

```
128Ø CLS: LOCATE 1Ø,1Ø: INPUT "What record number do you want to correct?  ",R
129Ø GET #1,R : CLS
13ØØ IF R > (LOF(1)/5Ø) THEN LOCATE 12,1Ø: PRINT "Record number greater than end
 of file ": FOR T = 1 TO 15ØØ: NEXT T : LOCATE 12,1Ø: COLOR ,1: PRINT STRING$(4Ø
,CHR$(32)): COLOR 15 : GOTO 128Ø
131Ø LOCATE 5,1Ø: PRINT AF$
132Ø LOCATE ,1Ø: PRINT BF$
133Ø LOCATE ,1Ø: PRINT CF$
134Ø LOCATE ,1Ø: PRINT DF$
135Ø IF AF$ = STRING$(3Ø,CHR$(32)) THEN LOCATE 5,1Ø: PRINT "The data for record
 number ";R;"has been deleted  ",X$ : FOR T = 1 TO 15ØØ: NEXT T : GOTO 15ØØ
136Ø LOCATE 1Ø,1Ø: INPUT "Do you wish to delete this data?  ",R$: IF LEFT$(R$,1)
 = "Y" OR LEFT$(R$,1) = "y" THEN LOCATE 12,1Ø: INPUT "Are you sure ?  ",R$
137Ø IF LEFT$(R$,1) = "Y" OR LEFT$(R$,1) = "y" THEN CLS: GOTO 154Ø
138Ø LOCATE 1Ø,1Ø: COLOR 1: PRINT STRING$(6Ø,CHR$(32)): COLOR 15
139Ø LOCATE 11,1Ø: INPUT "Enter correct desription  ",I$
14ØØ LOCATE 12,1Ø: INPUT "Enter correct location  ",L$
141Ø LOCATE 13,1Ø: INPUT "Enter correct date of purchase  ",D$
142Ø LOCATE 14,1Ø: INPUT "Enter correct cost  ",C$
143Ø LOCATE 16,1Ø: INPUT "Are these now correct ?  ",R$
144Ø IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLS : GOTO 131Ø
145Ø LSET AF$ = I$
146Ø LSET BF$ = L$
147Ø LSET CF$ = D$
148Ø LSET DF$ = C$
149Ø PUT #1,R
15ØØ CLS: LOCATE 9,1Ø: INPUT "Do you have more corrections?  ",R$
151Ø IF LEFT$(R$,1) = "N" OR LEFT$(R$,1) = "n" THEN CLOSE #1: CLS: GOTO 22Ø
152Ø IF LEFT$(R$,1) = "Y" OR LEFT$(R$,1) = "y" THEN GOTO 153Ø ELSE GOTO 15ØØ
153Ø GOTO 128Ø
154Ø I$ = STRING$(3Ø,CHR$(32))
155Ø L$ = STRING$(2,CHR$(32))
156Ø D$ = STRING$(8,CHR$(32))
157Ø C$ = STRING$(1Ø,CHR$(32))
158Ø LSET AF$ = I$
159Ø LSET BF$ = L$
16ØØ LSET CF$ = D$
161Ø LSET DF$ = C$
162Ø PUT #1,R : CLS: LOCATE 1Ø,1Ø: PRINT "Record number ";R ;"has been deleted "
: FOR T = 1 TO 15ØØ: NEXT T
163Ø GOTO 15ØØ
164Ø LPRINT CHR$(27);CHR$(31);CHR$(27);CHR$(19)
165Ø CLS: LOCATE 1Ø,1Ø: PRINT "Check printer"
166Ø LOCATE 12,1Ø: INPUT "Press <ENTER> to print  ",R$
167Ø T$ = "HOUSEHOLD FURNISHINGS"
168Ø GOSUB 227Ø
169Ø  R = 1 : GET #1,R
17ØØ LPRINT CHR$(27);CHR$(14);TAB(1Ø);T$;CHR$(27);CHR$(15)
171Ø LPRINT: LPRINT: LPRINT NF$
172Ø LPRINT AF$
173Ø LPRINT CYF$;" ";SF$
174Ø CLOSE #1
175Ø LPRINT STRING$(2,CHR$(1Ø))
176Ø LPRINT TAB(4);"Location";TAB(15);"Item";TAB(53);"Date ";TAB(62);"R#";TAB(7Ø
);"Cost"
177Ø LPRINT TAB(5Ø);"Purchased"
178Ø LPRINT
179Ø DIM D1$(12)
18ØØ D1$(1)= "GARAGE"
```

```
181Ø D1$(2)= "KITCHEN"
182Ø D1$(3)= "DINNETTE"
183Ø D1$(4)= "DINING ROOM"
184Ø D1$(5)= "FAMILY ROOM"
185Ø D1$(6)= "LIVING ROOM"
186Ø D1$(7)= "MASTER BR/BATH"
187Ø D1$(8)= "# 2 BR/BATH"
188Ø D1$(9) = "# 3 BR/BATH"
189Ø D1$(1Ø) = "BASEMENT"
19ØØ D1$(11) = "PATIO"
191Ø D1$(12) = "YARD"
192Ø GOSUB 1Ø6Ø
193Ø R = 1 : M = 12 : N = 5ØØ
194Ø FOR I = 1 TO M
195Ø LPRINT CHR$(27);CHR$(14);D1$(I);CHR$(27);CHR$(15)
196Ø LPRINT
197Ø IF I = M THEN GOTO 224Ø
198Ø R = 1
199Ø    FOR J = 1 TO N
2ØØØ      GET #1,R
2Ø1Ø      IF AF$ = STRING$(3Ø,CHR$(32)) THEN GOTO 22ØØ
2Ø2Ø      IF R = (LOF(1)/5Ø) + 1 THEN GOTO 222Ø
2Ø3Ø      IF LEFT$(BF$,1) = "1" THEN X$ = "GARAGE"
2Ø4Ø      IF LEFT$(BF$,1) = "2" THEN X$ = "KITCHEN"
2Ø5Ø      IF LEFT$(BF$,1) = "3" THEN X$ = "DINNETTE"
2Ø6Ø      IF LEFT$(BF$,1) = "4" THEN X$ = "DINING ROOM"
2Ø7Ø      IF LEFT$(BF$,1) = "5" THEN X$ = "FAMILY ROOM"
2Ø8Ø      IF LEFT$(BF$,1) = "6" THEN X$ = "LIVING ROOM"
2Ø9Ø      IF LEFT$(BF$,1) = "7" THEN X$ = "MASTER BR/BATH"
21ØØ      IF LEFT$(BF$,1) = "8" THEN X$ = "# 2 BR/BATH"
211Ø      IF LEFT$(BF$,1) = "9" THEN X$ = "# 3 BR/BATH"
212Ø      IF BF$ = "1Ø" THEN X$ = "BASEMENT"
213Ø      IF BF$ = "11" THEN X$ = "PATIO"
214Ø      IF BF$ = "12" THEN X$ = "YARD"
215Ø      IF X$ <> D1$(I) THEN GOTO 22ØØ ELSE A = VAL(DF$)
216Ø      LPRINT TAB(15);AF$;
217Ø      LPRINT TAB(51);CF$;
218Ø      LPRINT TAB(62);R;
219Ø      LPRINT TAB(66) USING"$#####.##";A : S1 = S1 + A
22ØØ      R = R + 1
221Ø    NEXT J
222Ø    LPRINT: LPRINT TAB(3Ø);"Sub Total";TAB(66) USING "$#####.##";S1 : T1 = T
1 + S1: S1 = Ø
223Ø NEXT I
224Ø LPRINT
225Ø LPRINT TAB(3Ø);"TOTAL";TAB(66) USING"$#####.##";T1
226Ø CLOSE #1 : CLS : LOCATE 1Ø,1Ø: PRINT "End of File - End ": END
227Ø OPEN "R",#1,"OWNER",9Ø
228Ø FIELD #1,3Ø AS NF$,3Ø AS AF$,15 AS CYF$,15 AS SF$
229Ø RETURN
23ØØ COLOR 4,7,9 : CLS
231Ø LOCATE 5,25: PRINT STRING$(25,"*")
232Ø FOR I = Ø TO 8: LOCATE ,25: PRINT "*";: LOCATE ,49: PRINT "*": NEXT I
233Ø LOCATE 7,28: PRINT "HOUSEHOLD INVENTORY"
234Ø LOCATE 9,31: PRINT "by E.H. Baade"
235Ø LOCATE 11,35: PRINT "For"
236Ø LOCATE 13,31: PRINT "TANDY 12ØØ HD"
237Ø LOCATE 15,25: PRINT STRING$(25,"*")
238Ø FOR T = 1 TO 2ØØØ: NEXT T : RETURN
```

PCM



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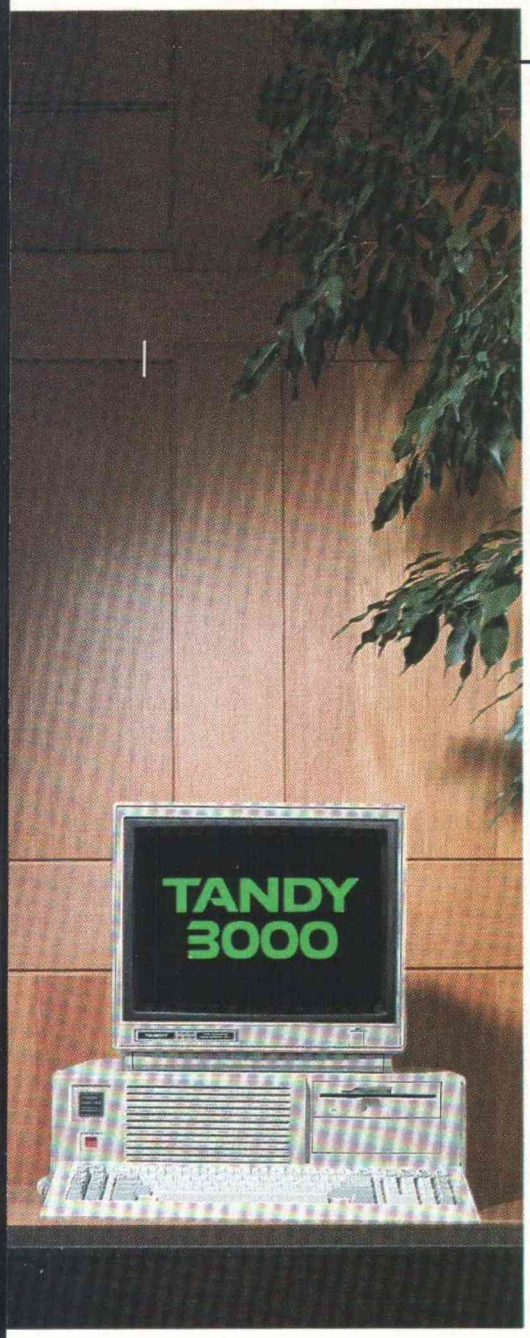

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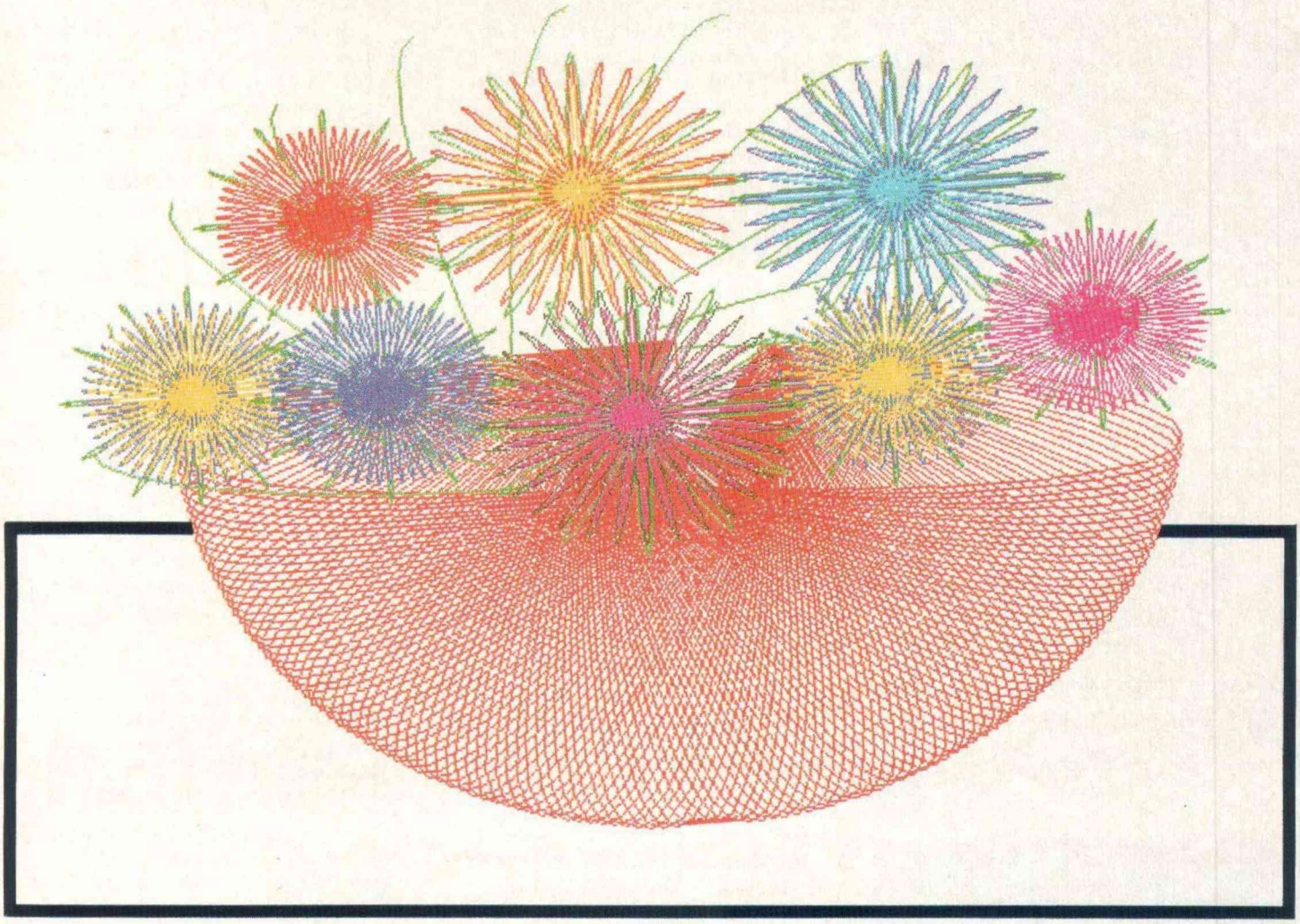
The Gallery



With Wayne Sanders, Curator

This month's featured exhibit is another example of how mathematical functions can be used to create beautiful graphics. In this case, ellipses are used to form a basket of flowers on your Tandy 2000's color monitor. This program came to us from Leonard Guay of Jacksonville Beach, FL.

If you would like to have your graphics creation presented here, send it in on disk with a letter describing how it works. If possible, include instructions on how to make your program work on each Tandy MS-DOS machine. A winning gallery exhibit is chosen each month and the "artist" is awarded $50. Address your entries to PCM Gallery, P.O. Box 385, Prospect, KY 40059.

```
1Ø ' Program by Leonard Guay-1475Ø Beach Blvd.#16
15 '            Jacksonville Beach,Fl.-3225Ø
2Ø ' Submitted to:PCM-1Ø/18/85 for approval.(THE GALLERY)
65 '*****Ellipse Rotation/Transformation**********
75 ' Formula: (X-HT)^2/A^2+(Y-VT)^2/B^2=1
8Ø ' Trasform: X=A*COS(Ø)+HT    AND  Y=B*SIN(Ø)+VT
85 ' Change values <A>,<B> to modify curve and(ASP)
9Ø ' Value <TH> is rotation angle and <HT,VT> values of translation.
95 REM***************PROGRAM***************
1ØØ KEY OFF:SCREEN 3:COLOR Ø,Ø:CLS
11Ø PALETTE 1,2:PALETTE 2,12:PALETTE 3,22:PALETTE 4,9:PALETTE 5,13:PALETTE 6,11:
PALETTE 7,23
12Ø XL=-6:XR=6:YT=-4:YB=5                                    :' Set Window
13Ø AL=ABS(XL):AR=ABS(XR):AT=ABS(YT):AB=ABS(YB)
14Ø SH=64Ø/(AL+AR):SV=4ØØ/(AT+AB)
15Ø HT=Ø:VT=Ø:PI=3.14159
16Ø A=4.5:B=2.2:ASP=1Ø/28:C=2:P=PI/128:CX=32Ø:CY=2ØØ:S1=Ø:E1=3:S2=.5*PI:E2=1.5*P
I:GOSUB 1Ø1Ø                                                 :'Draw Basket
17Ø  A=4.5:B=2:ASP=1Ø/28:C=1:P=PI/1Ø:CX=28Ø:CY=2ØØ:S1=Ø:E1=3.2:S2=Ø:E2=.5*PI:GOS
UB 1Ø1Ø                                                      :' Greens
18Ø CX=9Ø:CY=175:C=1                                         :' First Flower(2)
19Ø A=1.2:B=1:ASP=1/28:P=PI/6:GOSUB 1ØØØ
2ØØ CX=42Ø:CY=19Ø:GOSUB 1ØØØ
21Ø A=1::P=PI/24:C=4::GOSUB 1ØØØ
22Ø CX=9Ø:CY=175:GOSUB 1ØØØ
23Ø A=.95:B=.85:ASP=.5/25:P=PI/24:C=3:GOSUB 1ØØØ
24Ø CX=42Ø:CY=19Ø:GOSUB 1ØØØ
25Ø CX=28Ø:CY=9Ø:C=1                                         :' Second Flower(3)
26Ø A=1.5:B=1.5:ASP=1.5/28:P=PI/6:GOSUB 1ØØØ
27Ø CX=3ØØ:CY=2ØØ:GOSUB 1ØØØ
28Ø CX=43Ø:CY=1ØØ:GOSUB 1ØØØ
29Ø A=1.4:B=1.3:P=PI/16:ASP=1.2/28:C=4:GOSUB 1ØØØ
3ØØ CX=3ØØ:CY=2ØØ:C=7:GOSUB 1ØØØ
31Ø CX=28Ø:CY=9Ø:C=2:GOSUB 1ØØØ
32Ø A=1.2:B=.85:ASP=1/28:C=3:GOSUB 1ØØØ
33Ø CX=3ØØ:CY=2ØØ:C=5:GOSUB 1ØØØ
34Ø CX=43Ø:CY=1ØØ:C=6:GOSUB 1ØØØ
35Ø CX=52Ø:CY=17Ø:C=1                                        :' Third Fower(3)
36Ø A=1.2:B=1:ASP=1/28:P=PI/6:GOSUB 1ØØØ
37Ø CX=18Ø:CY=18Ø:C=1:GOSUB 1ØØØ
38Ø CX=16Ø:CY=95:C=1:GOSUB 1ØØØ
39Ø A=1:B=.85:P=PI/3Ø:C=2::GOSUB 1ØØØ
4ØØ CX=52Ø:CY=17Ø:C=5:GOSUB 1ØØØ
41Ø CX=18Ø:CY=18Ø:C=4:GOSUB 1ØØØ
42Ø GOTO 42Ø
1ØØØ S1=Ø:E1=3.2:S2=Ø:E2=6.4
1Ø1Ø FOR TH=S1 TO E1 STEP P:S1=SIN(TH):C1=COS(TH)
1Ø2Ø FOR T=S2 TO E2 STEP .2:X=A*COS(T):Y=B*SIN(T)*ASP
1Ø3Ø X1=X*C1-Y*S1+HT:Y1=X*S1+Y*C1+VT:IF T=Ø THEN PSET(X1*SH+CX,CY-Y1*SV),C
1Ø4Ø LINE-(X1*SH+CX,CY-Y1*SV),C:NEXT T:NEXT TH:RETURN
```

PCM

A crystal ball for your financial future

IRA Projection

By Leonard Hyre

One of the best ideas the federal government has had in the last decade has to be the Individual Retirement Account (IRA). It gives the average person the chance to build a future retirement fund without taxation on the money he or she puts away.

People who are considering such accounts invariably wonder about just how it all adds up, and rightly so. I love to plug in various figures and watch the theoretical interest come pouring in. You can get some practical use out of my IRA projection program and, at the same time, kick around lots of figures just to be sure you are choosing the right investment plan and financial institution.

This program, *IRA Projection*, is a simple demonstration of the fact that programs do not need to be long and complicated to be useful. Nor do "serious" programs have to be boring. A little pizazz in the title screen adds a lot to overall program appearance.

The first portion of the program is dedicated to displaying a fancy title screen and giving the author his ego strokes. To make the large letters, I create strings using the DRAW command syntax. For example, Line 290 is a string needed to draw the large letter 'I' (XI$). It is executed in the DRAW statement in Line 300. A touch of paint here and the title screen is finished.

IRA Projection's main program is built around a formula to calculate compounding interest on level installments over a number of years (lines 710 through 720). To use the formula, the user provides the needed figures (how much, how often, what interest rate, etc.) for a projection. This is handled in lines 530 through 650.

Once the program has calculated the results, the problem becomes one of effective display of the data. Lines 730 through 1170 handle this chore, giving the user an option to get a hardcopy as well as on-screen data. If you are a novice programmer, you might like to take a look at the use of PRINT USING to make the display format neat and useful. This command may be the most overlooked tool available to the new BASIC programmer, and it is one of the most powerful!

Typing in the program is a fairly simple matter; there are no long and complicated lines to check. Be careful in getting the syntax of PRINT USING correctly or the screen and printout could look jumbled.

I hope you find *IRA Projection* a useful addition to your software library. □

Leonard Hyre works as a claims representative for the Social Security Administration. He has written several articles for THE RAINBOW, PCM's sister publication for the Color Computer, and is the author of a number of commercial programs. He may be contacted at P.O. Box 403, Cambridge, MD 21613; 301-228-0064.

The listing:

```
10 ' ************************
20 ' *  IRA PROJECTIONS     *
30 ' *    by L  HYRE        *
40 ' *    (c)  12/85        *
50 ' *                      *
60 ' *  For TANDY MSDOS     *
70 ' *     Computers        *
80 ' ************************
90 '
100 '*** The TITLE SCREEN ***
110 '
120 KEY OFF:SCREEN 1,1:COLOR 0:CLS
130 '
```

```
14Ø '**** IF Your TANDY Is A Model 12ØØ, 2ØØØ, OR 3ØØØ DELETE Line 16Ø ***
15Ø '
16Ø PALETTE 1,2:'          *** We need some GREEN -for 1ØØØ ONLY! ***
17Ø DW$=STRING$(4,"$"):AC$=STRING$(17,"$"):BR$="$$ $$"
18Ø LINE(2Ø,2Ø)-(3ØØ,184),1,B,&H5555:'*** Strange Borders ***
19Ø LINE(25,25)-(295,179),1,B,&H5555
2ØØ LOCATE 7,12:PRINT AC$;:LOCATE 8,12:PRINT AC$:LOCATE 12,12:PRINT AC$:LOCATE 1
3,12:PRINT AC$:LOCATE 17,12:PRINT AC$:LOCATE 18,12:PRINT AC$
21Ø LOCATE 9,12:PRINT DW$:LOCATE 1Ø,12:PRINT DW$:LOCATE 11,12:PRINT DW$
22Ø LOCATE 14,25:PRINT DW$:LOCATE 15,25:PRINT DW$:LOCATE 16,25:PRINT DW$
23Ø LOCATE 9,25:PRINT DW$:LOCATE 16,12:PRINT DW$
24Ø LOCATE 5,18:PRINT BR$:LOCATE 6,18:PRINT BR$:FOR BR=9 TO 11:LOCATE BR,18:PRIN
T BR$:NEXT:FOR BR=14 TO 16:LOCATE BR,18:PRINT BR$:NEXT:LOCATE 19,18:PRINT BR$:LO
CATE 2Ø,18:PRINT BR$
25Ø '
26Ø '
27Ø '*** Create BIG Letters I, R and A ***
28Ø '
29Ø XI$="u1Ør1Øu5Ø11Øu1Ør3Ød1Ø11Ød5Ør1Ød1Ø13Ø"
3ØØ DRAW"bm35,128;c3;xxi$;"
31Ø XR$="u7Ør6Ød3Ø11Øf1Ød3Ø11Øu3Øh1Ø13Ød4Ø11Ø"
32Ø DRAW"bm125,128;c2;xxr$;"
33Ø LINE(135,65)-(175,8Ø),2,B
34Ø XA$="u6Øe1Ør3Øf1Ød6Ø11Øu3Ø13Ød3Ø11Ø"
35Ø DRAW"bm23Ø,128;c3;xxa$;"
36Ø DRAW"bm24Ø,88;c3;u15e5r2Øf5d1513Ø"
37Ø PAINT(38,125),1,3
38Ø PAINT(128,126),1,2
39Ø PAINT(233,125),1,3
4ØØ LOCATE 22,6:PRINT "Individual Retirement Accounts"
41Ø FOR DL=1 TO 1ØØØ:NEXT:LOCATE 25,16:PRINT "by L. Hyre";
42Ø FOR DL=1 TO 25ØØ:NEXT
43Ø '
44Ø '*** The MAIN PROGRAM ***
45Ø '
46Ø SCREEN Ø,1:WIDTH 8Ø:COLOR 4,7
47Ø CLS:PRINT CHR$(2Ø1);STRING$(78,CHR$(2Ø5));CHR$(187)
48Ø PRINT CHR$(186);SPACE$(23);" Individual Retirement Account ";SPACE$(24);CHR$
(186);
49Ø PRINT CHR$(2ØØ);STRING$(78,CHR$(2Ø5));CHR$(188);
5ØØ '
51Ø '*** Get Needed Input ***
52Ø '
53Ø COLOR Ø
54Ø A=Ø:B=Ø
55Ø LOCATE 6,6
56Ø INPUT"YOUR NAME";N$
57Ø LOCATE 8,6
58Ø INPUT"TOTAL DEPOSIT PER YEAR";C
59Ø LOCATE 1Ø,6
6ØØ INPUT"ANTICIPATED % INTEREST";D
61Ø LOCATE 12,6
62Ø INPUT"NO. TIMES COMPOUNDED/YR";E
63Ø LOCATE 14,6
64Ø LC=5
65Ø INPUT"NO. YEARS TO PROJECT...";F
66Ø '
67Ø '*** OUTPUT RESULTS TO SCREEN ***
68Ø '
```

```
69Ø CLS:GOSUB 88Ø
7ØØ FOR G=1 TO F
71Ø A=(1+D/(1ØØ*E))^E*(A+C)
72Ø B=FIX((1ØØ*A)+.5)/1ØØ
73Ø LOCATE LC,8
74Ø PRINT USING"##";G;:PRINT USING"  $#######.##";B
75Ø LC=LC+1
76Ø IF LC=15 THEN LC=5
77Ø IF G/1Ø=INT(G/1Ø) THEN GOSUB 9ØØ
78Ø NEXT G
79Ø PRINT:PRINT"Your Total Deposit Would Be ";:PRINT USING"$######.##";C*F
8ØØ PRINT"Net Increase Would Be ";:PRINT USING"$######.##";B-(C*F)
81Ø '
82Ø '*** PRINTER OPTION OFFERED ***
83Ø '
84Ø PRINT:PRINT"Press 'P' For PRINTOUT"
85Ø PRINT"Any Other Key For Another Projection!"
86Ø AN$=INKEY$:IF AN$=""THEN 86Ø
87Ø IF AN$="P" OR AN$="p" THEN 98Ø ELSE 47Ø
88Ø XA$="IRA Projection for:":XX$=XA$+N$:LOCATE 1,1:PRINT XX$
89Ø RETURN
9ØØ LOCATE 6,4Ø:COLOR 4:PRINT"< Press any key to continue >"
91Ø LOCATE 7,4Ø:PRINT"_____":COLOR Ø
92Ø AN$=INKEY$:IF AN$=""THEN 92Ø
93Ø CLS:PRINT XX$
94Ø RETURN
95Ø '
96Ø '*** PRINTOUT ROUTINE ***
97Ø '
98Ø CLS
99Ø PRINT:PRINT "PRINTING OPERATION IN PROGRESS"
1ØØØ PRINT"ONE MINUTE PLEASE!"
1Ø1Ø LPRINT STRING$(8Ø,"=")
1Ø2Ø LPRINT"INDIVIDUAL RETIREMENT ACCOUNT PROJECTION FOR: ";N$
1Ø3Ø LPRINT "BASED ON DEPOSITS OF $";C;" OVER ";F;" YEARS"
1Ø4Ø LPRINT "ANTICIPATED INTEREST RATE IS ";D;"% COMPOUNDED ";E;" TIMES/YEAR"
1Ø5Ø LPRINT STRING$(8Ø,"-")
1Ø6Ø H=Ø
1Ø7Ø A=Ø:B=Ø
1Ø8Ø FOR G=1 TO F
1Ø9Ø A=(1+D/(1ØØ*E))^E*(A+C):B=FIX((1ØØ*A)+.5)/1ØØ
11ØØ LPRINT TAB(25);
111Ø LPRINT "YEAR # ";:LPRINT USING"##";G;:LPRINT"    ";:LPRINT USING"$######.##
";B
112Ø NEXT G
113Ø LPRINT:LPRINT TAB(13);"TOTAL DEPOSITS=";:LPRINT USING"$######.##";C*F;:LPRI
NT" FOR NET INCREASE OF ";:LPRINT USING"$######.##";B-(C*F)
114Ø LPRINT:LPRINT STRING$(8Ø,"_")
115Ø PRINT"OPERATION COMPLETED"
116Ø PLAY"O4C"
117Ø FOR DL=1 TO 4ØØ:NEXT
118Ø '
119Ø '*** DO ANOTHER PROJECTION? ***
12ØØ '
121Ø LOCATE 23,6:PRINT"Do you want another projection ? ( Y/N )"
122Ø AP$=INKEY$:IF AP$=""THEN 122Ø
123Ø IF AP$="Y" OR AP$="y"THEN 47Ø
124Ø IF AP$="N" OR AP$="n"THEN END
125Ø GOTO 123Ø
```

PCM

This program won't help you beat the high cost of living, but at least you'll know what to expect

Inflation Tracker

By James Ray

Loss of our American buying power due to inflation is something that we have all grown accustomed to expect. Regrettably, it is something that we all have to deal with as no one is able to escape its effect.

Inflation is related to a number, or index, that the government gives on a monthly basis that reflects the increase (or decrease) in the average cost of certain goods and services. These goods usually include food prices, gasoline prices, housing costs and utilities. The changes in the cost of these goods are added together and averaged over the year to give us what we call "the annual inflation rate."

Between the years of 1972 to 1985, the annual inflation rate has averaged 7.3 percent. The highest

James Ray is a minister at the Cooper River Baptist Church in North Charleston, South Carolina. Computer programming is a hobby along with woodworking and water skiing. James has also written several programs for the Tandy Color Computer.

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year of inflation during this period was in 1980 at 13.5 percent and the lowest year during the same period was in 1972 at 3.3 percent.

I was interested in the relationship between my earnings and the effects of inflation on those hard earned dollars. Suppose you made $10,000.00 in 1972. What would you need to earn in 1986 to have the same buying power as in 1972? The answer: $26,705.98. (Maybe this program was not such a good idea!)

The inflation rate is a summary of the change in the cost of certain goods and services. These changes do not affect everyone in the same manner. For example, suppose in a given year, housing costs increase a whopping 15 percent. This 15 percent would be reflected in the annual inflation rate; however, for people not buying a house, it would have no direct effect on their buying ability. Likewise, should food costs increase dramatically, it would affect a household of seven more than a household of two.

Operation

The program menu will give you four options. The first option is a straight inflation application (see Figure 1). This application is used for the period between the years of 1972 and 1985. You will be asked to enter the year to begin the application and the amount to be compared. The application is estimating a 3.7 percent inflation rate for 1985. When the exact rate is known, you can place it in Line 190 (first number).

The second option is a projection application and you are not required to stay in the 1972 through 1985 range. With this application, you can begin with any year, end with any year, and select any inflation rate you choose. For example, suppose you want to estimate what you will need to earn in the year 2000 to keep up with inflation. Suppose you will make $26,705.98 in 1986 and you are estimating that the inflation rate between the years of 1986 and 2000 will average 4 percent (wishful thinking?). You will need $46,246.10 in the year 2000 (see Figure 2). Note that this is an estimate.

This is an excellent application for insurance personnel who need to estimate future needs for their clients.

Printing a hard copy of any of the charts is simple with the Tandy computers. When you have the chart or application on the screen that you desire, press SHIFT-PRINT to get a printout.

The third menu option is a tutorial and gives some assistance with the program even though the program is very friendly and gives appropriate prompts. I like this kind of information in the program so you do not have to refer back to the magazine for instructions.

The fourth option is the end option and not only ends the program but erases it from memory. If you are typing this in, be sure to save as you go along!

The inflation rates used in this program were obtained from the U. S. Department of Commerce in Washington, as printed in *News and World Report Magazine*. I will admit that I have seen other figures mentioned when referring to the inflation rates. If you find other rates you want to use, replace the figures in Line 190.

This program is available on PCM ON DISK or directly from me for $15. Contact me if you are interested in future upgrades. Write to 5065 Frances Avenue, N. Charleston, SC 29406. Enjoy!

The listing:

```
1Ø 'BY J. D. Ray
2Ø '   5Ø65 FRANCE AVENUE
3Ø '   N. CHARLESTON, S.C. 294Ø6
4Ø '   <C> COPYRIGHT JAN., 1985
5Ø 'VERSION 2.1
6Ø KEY OFF
7Ø CLS:COLOR 1Ø,Ø,1Ø:LOCATE 7,36:PRINT"INFLATION"
8Ø FOR Z=1 TO 25Ø :NEXT Z
9Ø LOCATE 9,39:PRINT"by"
1ØØ LOCATE 11,36:PRINT"James Ray"
11Ø LOCATE 12,32:PRINT"5Ø65 France Avenue"
12Ø LOCATE 13,29:PRINT"N. Charleston, SC  294Ø6"
13Ø COLOR 12,Ø:LOCATE 24,34:PRINT"Copyright 1985";
14Ø FOR J=1 TO 95Ø :NEXT J
15Ø CLEAR 1ØØ
16Ø DIM INF(15),A(12),R(12),M(5Ø)
17Ø FOR X=1 TO 15 :READ INF(X):NEXT
18Ø 'INFLATION RATES LISTED IN 18Ø ARE FOR 1985-1972, IN THAT ORDER
19Ø DATA 3.7,4.Ø,3.8,6.1,1Ø.4,13.5,11.3,7.7,6.5,5.8,9.1,11.Ø,6.2,3.3,Ø
2ØØ Q=Ø :D=Ø : SIG=Ø
21Ø H$="#####.##":P$="##.#":Z$="$$###,###.##"
22Ø T$="$###,###.##":D$="#######.##":E$="###.##"
23Ø STA$="Actual Inflation"
24Ø PRO$="Projected Inflation"
25Ø K$="Application"
26Ø YEAR$=""
```

```
27Ø CLS:COLOR 11,Ø,11:LOCATE 7,3Ø:PRINT"Program Application"
28Ø LOCATE 11,3Ø:PRINT"<1> ";:PRINT STA$
29Ø LOCATE 12,3Ø:PRINT"<2> ";:PRINT PRO$
3ØØ LOCATE 13,3Ø:PRINT"<3> Tutorial"
31Ø LOCATE 14,3Ø:PRINT"<4> End"
32Ø LOCATE 16,3Ø:PRINT"    Selection #: "
33Ø MENU$=INKEY$ :IF MENU$="1" THEN GOTO 37Ø
34Ø IF MENU$="2" THEN GOTO 67Ø
35Ø IF MENU$="3" THEN 94Ø
36Ø IF MENU$="4" THEN 9ØØ ELSE 33Ø
37Ø 'Straight Application Routine
38Ø CLS:COLOR 6,Ø:LOCATE 7,29:PRINT"Straight Application"
39Ø COLOR 15,Ø:LOCATE 9,25:PRINT"Enter Year To Begin Application"
4ØØ LOCATE 1Ø,31:PRINT"Between 1972-1986"
41Ø LOCATE 12,25:INPUT "Enter Year (19xx): "; YEAR
42Ø IF YEAR<1972 OR YEAR>1986 THEN LOCATE 15,22,Ø:COLOR 2Ø,Ø:PRINT"  PLEASE USE
YEAR BETWEEN 1972 - 1986!":SOUND ON:NOISE Ø,8,12:FOR CC=1 TO 15ØØ:NEXT CC:LOCATE
 15,22:PRINT SPACE$(4Ø):COLOR 15,Ø:GOTO 39Ø
43Ø X=1986-YEAR :KK=X :YR=YEAR
44Ø LOCATE 14,25:PRINT"Enter Amount To Begin Application:"
45Ø LOCATE 15,25:INPUT "Amount $ ";A
46Ø AM=A
47Ø IF A<Ø THEN LOCATE 18,25,Ø:COLOR 2Ø,Ø:PRINT"ENTER A POSITIVE AMOUNT - PLEASE
":NOISE Ø,8,12:FOR CC=1 TO 15ØØ:NEXT CC:LOCATE 18,25:PRINT SPACE$(34):COLOR 15,Ø
:GOTO 45Ø
48Ø CLS:COLOR 6,Ø,Ø:PRINT TAB(6) "DATE: ";DATE$;"           INFLATION";"
    TIME: ";TIME$
49Ø LOCATE 3,6:PRINT"Based On";:PRINT USING Z$;AM;:PRINT" in"YR;"the following A
mount is Needed to Keep":LOCATE 4,6:PRINT"in Line with Inflation:  (RATE listed
is for previous year)"
5ØØ LOCATE 6,8:PRINT"YEAR:      RATE:     INCREASE      ADJ. TOTAL":COLOR 15,Ø
51Ø L=7 :N = 7
52Ø I=Ø
53Ø LOCATE L,N:PRINT YEAR,TAB(41);:PRINT USING Z$; A
54Ø YEAR=YEAR+1
55Ø I=A*INF(X)/1ØØ :A=A+I
56Ø L=L+1
57Ø LOCATE L,N:PRINT YEAR,:PRINT USING H$;INF(X);:PRINT"%",:PRINT USING H$;I,:PR
INT"    ";:PRINT USING Z$; A
58Ø YEAR=YEAR+1 :X=X-1
59Ø IF YEAR>1986 THEN 61Ø
6ØØ GOTO 55Ø
61Ø LOCATE 23,12:COLOR 24,Ø:PRINT"Hit <ENTER> for Menu";:LOCATE 23,35:PRINT"Pres
s <SHIFT> <PRINT> for Hardcopy";:COLOR 15,Ø
62Ø E$=INKEY$:IF E$="" THEN 61Ø
63Ø GOTO 2ØØ
64Ø FOR P=1 TO 5ØØ :NEXT P
65Ø GOTO 2ØØ
66Ø 'PROJECTED INFLATION APPLICATION
67Ø CLS:D=Ø
68Ø PRINT TAB(34) "PROJECTION"
69Ø LOCATE 3,5:PRINT"This is a Projection of the effects inflation will have on
your dollars":LOCATE 4,5:PRINT"in the Future.  You will need to enter the year t
o begin the":LOCATE 5,5:PRINT"Projection, the Amount, and the Year to end the Pr
ojection."
7ØØ LOCATE 6,5:PRINT"You will need to Estimate the Inflation Rate for the period
.  There":LOCATE 7,5:PRINT"are no year limitations to this application.  THIS IS
 AN ESTIMATE!!"
71Ø COLOR 1Ø,Ø:LOCATE 9,12:PRINT"Enter the Year to Begin the Projection: ";:COLO
```

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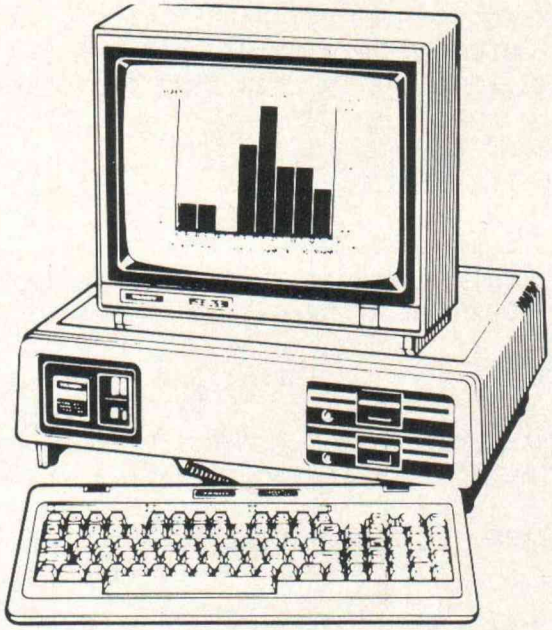

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```
R 15,Ø:INPUT YR
72Ø COLOR 1Ø,Ø:LOCATE 11,5:PRINT"Enter the Amount to be used in the Projection:
":COLOR 15,Ø:INPUT AP
73Ø COLOR 1Ø,Ø:LOCATE 13,14:PRINT"Enter the Year to end the Projection: ";:COLOR
 15,Ø:INPUT YS
74Ø COLOR 1Ø,Ø:LOCATE 15,2:PRINT"Enter the Average Est. Inflation Rate (Per Year
): ";:COLOR 15,Ø:INPUT RATE
75Ø P=YS-YR
76Ø FV=AP*(1+RATE/1ØØ)^P
77Ø D=Ø:CLS:COLOR 6,Ø:PRINT TAB(34)"PROJECTION","     DATE: ";DATE$
78Ø LOCATE 5,17:PRINT"Beginning Year: "
79Ø LOCATE 7,25:PRINT"Amount: "
8ØØ LOCATE 9,17:PRINT"Est. Inflation: "
81Ø LOCATE 11,4:PRINT"Amount Needed in Year"YS; ":"
82Ø COLOR 15,Ø
83Ø LOCATE 5,35,Ø:PRINT YR
84Ø LOCATE 7,34,Ø:PRINT USING Z$; AP
85Ø LOCATE 9,35,Ø:PRINT USING P$;RATE;:PRINT" % per year"
86Ø LOCATE 11,34,Ø:COLOR 31,Ø:PRINT USING Z$; FV:COLOR 15,Ø
87Ø LOCATE 23,12:COLOR 24,Ø:PRINT"Hit <ENTER> for Menu";:LOCATE 23,35:PRINT"Pres
s <SHIFT><PRINT> for Hardcopy";:COLOR 15,Ø
88Ø E$=INKEY$:IF E$="" THEN 88Ø
89Ø GOTO 2ØØ
9ØØ 'END ROUTINE
91Ø CLS:PRINT:INPUT"Are you sure? Program will be ERASED!!  (Y/N) ";ED$
92Ø IF ED$="Y" OR ED$="y" THEN END:NEW
93Ø IF ED$="n" OR ED$="N" THEN GOTO 2ØØ
94Ø CLS:COLOR 14,Ø,14:PRINT TAB(35)"INFLATION"
95Ø LOCATE 3,1:PRINT" This program attempts to provide the user with the effects
 of inflation on      your hard earned dollars.  This program can be used in two
 ways: "
96Ø PRINT" ":PRINT" 1) The Actual Application lets you see the effects of inflat
ion between the        years of 1972 - 1985.  The annual inflation rates are lis
ted with the           application.  The inflation rates used here were found in
 the 'U.S."
97Ø PRINT"    NEWS AND WORLD REPORT Magazine:"
98Ø PRINT " "
99Ø L=11 :X2=14
1ØØØ FOR X1=1972 TO 1985:LOCATE L,12:PRINT X1;"   ";:PRINT USING P$;INF(X2);:PRI
NT"%":L=L+1:X2=X2-1:NEXT X1
1Ø1Ø FOR S1=Ø TO 14:TT=INF(S1)+TT:NEXT
1Ø2Ø TT=TT/14 :LOCATE 15,4Ø:PRINT"AVERAGE: ";:COLOR 3Ø,Ø:PRINT USING P$;TT;:PRIN
T"%"
1Ø3Ø COLOR 14,Ø:LOCATE 23,35:PRINT "HIT <ENTER> TO CONTINUE";
1Ø4Ø E$=INKEY$:IF E$="" THEN 1Ø4Ø
1Ø5Ø CLS:PRINT:PRINT" 2) The PROJECTION APPLICATION allows the user to use any y
ear and any            inflation rate to project future effects of inflation o
n our American         dollar.
1Ø6Ø PRINT:PRINT" 3) END will erase the program from memory."
1Ø7Ø PRINT:PRINT" Remember that Inflation rates are averages of the actual incre
ases in certain   consumer products.  They reflect the average yearly cost of fo
od, housing,      utilities, and other essentials."
1Ø8Ø PRINT:PRINT" ENTER years as 19XX and dollar amounts without commas.  Inflat
ion rates         should be listed as whole numbers.  (5% = 5, 7 1/2%= 7.5)"
1Ø9Ø PRINT:PRINT" For a print-out of charts, press <SHIFT> <PRINT> when the char
t you want        is on the monitor screen."
11ØØ LOCATE 23,23:PRINT"Hit <ENTER> to Return to Menu"
111Ø E$=INKEY$:IF E$="" THEN 111Ø
112Ø GOTO 2ØØ
```

PCM

Add zip to your BASIC programs with the GW-BASIC compiler

Compiling BASIC Programs

By Robert D. Covington

As a computer language, BASIC always seems to be looked down upon as a good language for developing programs. For some reason, if you tell some people that you wrote a program in BASIC, they seem to think that the program is not very good and operates at a slow speed.

Of course, if you were to take that same program, make a few changes and compile it in C, FORTH, ADA, PASCAL or any other "respectable" language, these people would automatically think that the program is faster and more useful.

Why has BASIC achieved such a bad reputation? From what I can tell, there are two main reasons for BASIC's bad image. First, becasue of BASIC's flexibility, poorly structured programs can be created and will still work. When "professional" programmers look at the code, they are appalled by its lack of structure and assume that any language that could support such "trash" is automatically bad. I am not saying the non-structured programs are bad, just that they seem to be looked down upon by some programmers.

The second problem with BASIC is that many think it is a slow language. Sure, when you are running BASIC in an interpreted mode, programs tend to run rather slowly. What most people seem to forget is that *any* language runs slowly in an interpreted environment. Unfortunately, it is easy to forget that compiler BASICs exist since there are so many more interpreted BASICs. Fortunately, though, compilers do exist for BASIC that allow BASIC programs to run as fast or sometimes even faster than programs written in other high level languages.

This brings us to the topic of this month's Subroutine City — compiling BASIC programs. To help exemplify the compiling process, I will describe in detail how to compile last month's *DB11* database system.

Before I get into the compiling, let me first make a few comments about *DB11*.

DB11 Modifications

Listing 1 contains a few lines of code that need to be added to the existing *DB11* subroutine module. Since this module was merged with each of the other modules in the database, all four main modules (MAIN.BAS, DBFORM.BAS, DATAMAN.BAS and PRINT.BAS) need to incorporate these changes.

The easiest way to do this is to type in Listing 1 in BASIC, save the file in ASCII format (SAVE"CHANGES.BAS",A) and merge that file with the other *DB11* modules (LOAD"MAIN", MERGE"CHANGES", SAVE"MAIN"). Once this process is complete, the dummy file can be deleted.

Listing 2 contains a few additional lines that need to be added to each of the individual *DB11* modules.

In addition to these line additions, the *DB11* module named PRINT.BAS also requires that lines 51100 through 51105 be deleted.

These changes to *DB11* serve three major purposes. First, the changes in lines 15 through 22 in each of the modules reduce the amount of memory needed to store array information and gives BASIC more room for string data. This in effect reduces the number of "garbage collections" (reorganization of the string space) and thus increases the system speed. Second, the changes in Listing 1 incorporate the new MS-DOS access subroutine into the *DB11* database system. The benefits of this new subroutine will be described later in this article. Lastly, the remaining changes fix a few bugs, typos and errors that were in the *DB11* database system as published.

The GW-BASIC Compiler

While *DB11* operates at a usable speed in interpreted BASIC, the database does not have the "lightning fast" response time that really makes a program much easier to use. To give *DB11* the extra speed it really should have, the system needs to be compiled into machine language by a GW-BASIC-compatible compiler.

Before I describe compiling *DB11*, let me stop for a moment and describe what compiling is and describe some of its pros and cons.

Normally, when you type BASIC or BASICA at the MS-DOS prompt, a BASIC language interpreter is loaded. This interpreter is responsible for "translating" the BASIC code that you give it into code the CPU can understand. For every instruction executed, the BASIC interpreter must:

- Load the next instruction and check to see if it is a legal BASIC instruction.
- If the instruction is not legal, it checks to see if it is a variable assignment.
- If the instruction is a legal BASIC command, it checks to see if the instruction has any parameters and proceeds to convert them into something it can understand. For example, if you told BASIC to PRINT 3+5, it would convert the 3+5 into a binary representation of eight.
- BASIC then checks to see if the parameters that are needed to execute the instruction are all present and that they are within proper bounds.
- If the parameters provided are in

Bob Covington has been a computer programmer and consultant for the past six years, most recently focusing his attention on both the Model 100 and the 2000. He is also a technical writer and editor. Bob can be contacted at P.O. Box 37007, St. Louis, MO 63141.

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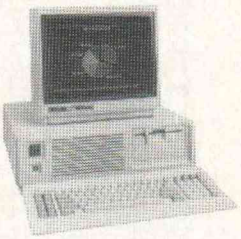

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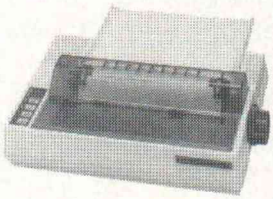

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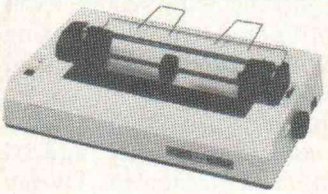

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formula form, the interpreter not only has to interpret the algebraic formula but must also change all the variables to managable precisions before performing the calculations. In addition, since multiple precisions are supported, BASIC must determine which math routine is used for the precision currently being used in the calculation.

- Finally, BASIC executes the actual code associated with the instruction and then repeats this process until the program ends. Of course, throughout all of these phases of an instructions execution, the computer must check to see if the BREAK key is being pressed.

As you can see, BASIC does quite a bit of work for each instruction it executes. A large percentage of this work ends up being used for checking syntax, converting data, finding variables, finding which instructions need to be executed and other overhead.

When a program is compiled, however, this overhead is greatly reduced and in most cases eliminated. During the compiling phase, it performs the following operations:

- It ignores remarks, extra spaces, tabs, etc., that make programs easier to read but use up space and time in normal interpreted BASIC.
- Performs all syntax checking associated with an instruction.
- Evaluates and optimizes as many algebraic formulas as possible. This means that instructions such as `PRINT 3+5` are automatically converted into `PRINT 8`.
- Converts any constants to binary data. This means BASIC does not have to keep converting numbers to binary before evaluating instructions.
- Determines the precision used by each algebraic formula so that only the routines necessary to evaluate the formula in a particular precision are used. For example, when evaluating `A%+B%`, only the integer addition routines are added to the code. The resulting code does not have to check the precision of `A%` and `B%` and decide which math routine to use.
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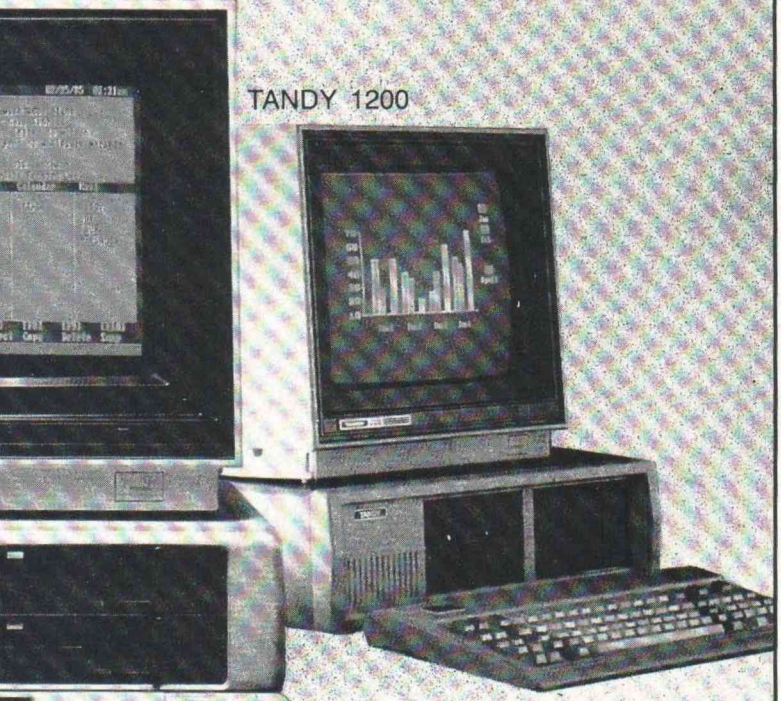

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When the compiling process is complete, the compiler produces a machine language object module of the BASIC program. Because of the optimization, programs end up running five to 50 times faster. Unfortunately, since most BASIC instructions require at least three to 15 bytes of machine language code, the compiled programs end up being quite a bit larger than their interpreted counterparts.

Another problem with the *Microsoft GW-BASIC Compiler* sold by Radio Shack is that it is not 100 percent compatible with the interpreted BASIC. In most cases, these problems are caused by enhancements and usually can be circumvented. Some of the differences between the GW-BASIC compiler and the interpreter are:

- Strings in the compiler can hold 32,767 characters instead of 255. Because of this, the string descriptor for all of the strings used by the compiled BASIC program contain an extra byte to describe the string's length. Programs that use peeks to find the location of the string and programs that use machine language subroutines need to be changed to account for this.
- All BASIC immediate mode commands such as LIST, RUN, EDIT, etc., are not supported by the compiler. In addition, the program instructions BLOAD, BSAVE and ERASE are also not supported.
- The maximum number of characters per line for the compiler is 252 instead of 255.
- Double-precision variables can be used in FOR/NEXT loops by the compiler unlike interpreted BASIC.
- Double-precision numbers can be used with all math operations and transcendentals.
- Garbage collections are not as frequent.
- The CHAIN instruction's power is greatly reduced by the compiler. Most programs that heavily use overlays require quite a bit of reworking to work with the compiler.
- RUN now executes .EXE files instead of .BAS files. Since other compiler BASIC programs are also .EXE files, this change makes sense. This difference does require, however, that you either omit the .BAS extention on a RUN or change it to .EXE.
- The machine language to BASIC interfaces are handled differently with the compiler. These differences will be described later in detail.

• All PEEK, POKE and USR instructions *must* be preceded by a DEF SEG instruction to work properly in compiler BASIC. This fact is very important and is not very well documented in the BASIC compiler manual.

There are other, more subtle, differences between compiler BASIC and interpreted BASIC, but the above are the most significant ones.

The major incompatibility problem comes primarily with machine language subroutines. In interpreted BASIC, the first parameter (always a variable) specifies the address of the machine language program. Then, when the CALL instruction is performed, a long CALL is made to the address created by the last DEF SEG instruction and the variable specified in the CALL instruction.

With compiler BASIC, however, machine language programs are integrated into the compiled BASIC object file with MS-DOS's LINK utility.

To support this, the compiler assumes that the text following a CALL instruction is the name of the machine language procedure (subroutine). This name is not a variable and cannot be treated as such in the program. For example, before compiling one of the subroutines that use my machine language access subroutine, the part of the program that locates the machine langauge subroutine in memory for the variable after the CALL would need to be eliminated.

To properly integrate machine language subroutines in the GW-BASIC compiler, the subroutine must obide by the following rules:

• The entire machine language subroutine must be defined as a far procedure. The name of the procedure must match the name used after the CALL instruction in the BASIC program.

• The procedure/subroutine name needs to be defined as a PUBLIC reference.

• The subroutine must be 100 percent relocatable (be able to be stored anywhere in memory) and require no modifications by the BASIC program. For example, the machine language access subroutine described in this column required that the interrupt number be changed by the BASIC program. This type of programming is illegal with the BASIC compiler.

• Any references to strings must support the 4-byte string descriptor instead of BASIC's 3-byte descriptor. The first two bytes of a string's descriptor in the compiler contain the length of the string and the last two bytes contain the address of the string in the current data segment.

• None of the segment registers must be modified by the machine language subroutine. In compiler BASIC, the code segment (CS) and data segment (DS) are almost always different but the string segment (ES) and the data segment (DS) are usually identical. In any event, modifying the segment registers will almost definitely cause the compiled program to crash.

• The BP register *must* be preserved by the machine language subroutine. In normal interpreted BASIC, BP should be preserved but it will usually not cause too many problems if it is destroyed. In compiler BASIC, however, there is no option; BP must be saved. To be on the safe side, BP should always be saved with either BASIC.

• String lengths should not be altered by machine language subroutines. In standard GW-BASIC, you might have been able to get away with modifying

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the string length, but in compiler BASIC, it causes many problems. A good rule of thumb for any GW-BASIC machine language subroutine is to use only BASIC to change the length of a string. One way of doing this is to return the desired length of the string to BASIC in an integer variable and use BASIC's LEFT$ to change the string's length.

- The machine language subroutine must abide by all the rules associated with a machine language subroutine in interpreted BASIC. For more information on these rules, see my July 1985 installment of Subroutine City in PCM.
- The machine language subroutine must be assembled into an .OBJ file for linking with the compiled BASIC program. Because of this, machine language programs that are "hand assembled" or assembled with DEBUG must be re-assembled with the *Microsoft Macro Assembler* (sometimes it seems like Microsoft is trying to monopolize the compiler business).

If the machine language subroutine can meet the above requirements, then installing the subroutine is usually fairly easy. Unlike interpreted BASIC, compiler BASIC does not require that you load the subroutine into memory and locate its address. As a matter of fact, only the compiler and linker have any control over where the subroutine goes in memory.

Compiling BASIC Programs

The first step in compiling a program is usually entering and checking the program in interpreted BASIC. While interpreted BASIC is fairly slow, debugging is much easier and faster. Of course, if you are developing a program that eventually will be compiled, make sure not to use any instructions or features that are not supported by the compiler. Most importantly, do not use PEEKs and POKEs to find information from BASIC's internal system memory. All of these addresses change or are eliminated with the compiler. If PEEKs and POKEs are used, make sure they only address MS-DOS system memory which usually does not change between languages or programs.

Once the program is created and thoroughly debugged, check that no lines are longer than 252 characters and save the program in ASCII format. This is done using the SAVE"*filename*",A instruction in GW-BASIC.

Next, return to DOS and execute the compiler. When the compiler starts up, it asks for the source, object and source listing filename. The source filename describes the BASIC program that is to be compiled. The object filename describes the .OBJ file that is created by the compiler which will contain the machine language instructions for the BASIC program. The source list filename describes an optional listing that can be generated by the compiler during compiling. Any compiling errors that are detected are printed on the listing along with the code compiled. In addition, this listing can optionally contain the actual machine language source code generated by the compiler for the BASIC program. This source code, while interesting, is usually very long and never needed for anything practical.

In addition to these three prompts, the compiler supports 10 compiler switches that can be entered at any of the three compiler prompts. All of these commands begin with a slash and should be entered after any filename entry. The 10 compiler options supported by the compiler are:

- /4 and /T — These switches are used for compiling programs that were designed to run under M-BASIC, Microsoft's 8-bit computer BASIC interpreter.
- /E and /X — These switches are used to tell the compiler that error checking routines are used in the BASIC program. The /E switch allows ON ERROR GOTO and RESUME *line number* instructions to be compiled correctly. The /X switch allows ON ERROR GOTO and any RESUME instruction to be compiled. If the /E switch is used and a RESUME or RESUME NEXT instruction is encountered during compiling, the compiler generates an error. The only advantage of the /E switch is that it generates less code than the /X switch. In other words, do not use the /X switch unless you need it. Programs that do not use any error checking routines and use neither of these switches tend to be noticeably shorter.
- /A — This switch tells the compiler to include the source code for the actual machine language instructions generated during compiling on the source listing. This option is usually only used by true "hackers" who cannot sleep unless they know what the code generated by the compiler looks like in machine language. In most cases, this option is not used since it creates a *huge* source listing.
- /D — This switch adds extra code to the compiled program to aid in debugging. When this option is used, line numbers and bound checking (array and variable) code is added to the resulting compiled program. This switch must be used if you are using the TRON or TROFF instructions and if you want line numbers to be displayed when errors are detected. This option is great for debugging but should always be omitted in the final program since this switch increases the size of the compiled program.
- /N — This switch eliminates the need for line numbers on every line of your BASIC program. When this option is selected, line numbers are only needed for specifying locations for GOTOs, GOSUBs and other line-oriented instructions. This switch is great for creating BASIC programs with the "structured look." The only problem with using this flag is that you cannot create BASIC programs without line numbers on every line in normal GW-BASIC. This means that you have to use EDLIN, a word processor, or a text editor for entering the program. If this option is used, make sure that all of the lines still use less than 252 characters per line.
- /R — This switch tells the compiler to store arrays in row-major order instead of column-major order. In most cases, this switch is never used unless you are converting a program from another high level language to the BASIC compiler.
- /S — This switch tells the compiler to store strings on disk as they are encountered instead of storing them in memory during compiling. Normally when this switch is not used, text strings are stored in memory during the compiling phase. If an identical text string is found, the compiler detects this and only writes one copy of the text string on disk when it finishes compiling. In most cases, not using this option will reduce the size of the resulting compiled program. The only time this option is used is when there is not enough memory in the system for the compiler to store the text strings and its own internal data. In other words, the /S switch is usually used to compile large programs with little memory.
- /O — This switch tells the compiler to use the BASCOMG.LIB instead of the run-time library BASRUNG.LIB. Normally, when this switch is not used, the BASIC compiler assumes that a program called BASRUNG.EXE will be on the disk along with the compiled program. When the compiled program is executed, it automatically loads the BASRUN

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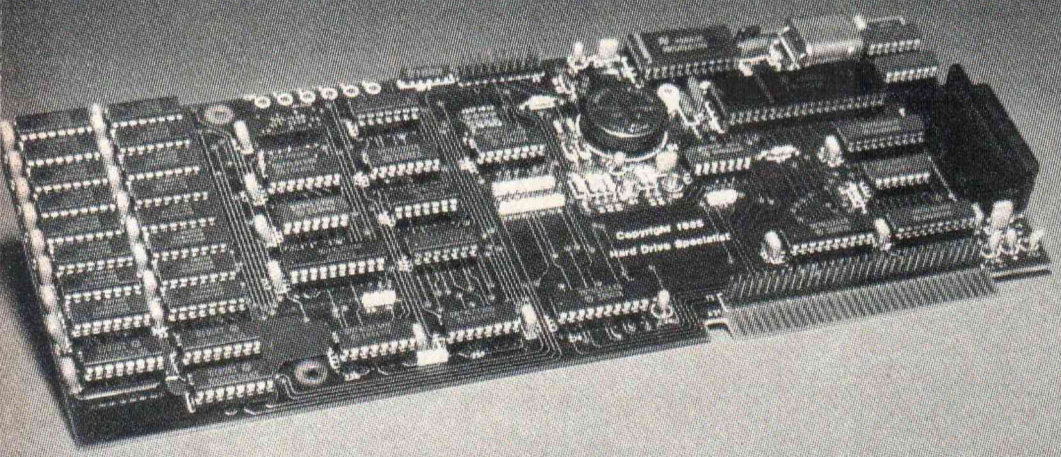

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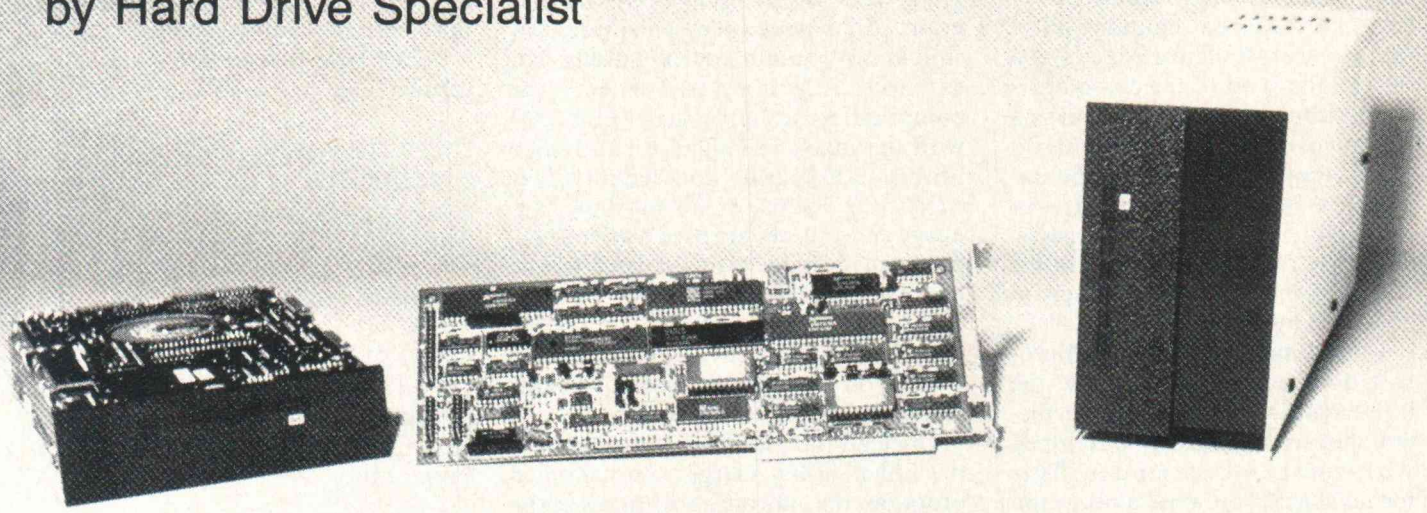

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G.EXE file into memory at the same time. This program is responsible for providing a set of common subroutines that can be utilized by the compiled program. For example, instead of the compiled program containing all of the code necessary to execute a PRINT statement, the program just executes a long CALL to the subroutine in BASRUNG.EXE that contains all of the necessary code for executing a PRINT. Since all of the commonly-used subroutines for supporting BASIC instructions are in this library, they do not need to be duplicated in other compiled programs on the disk. In most cases, using the runtime support module reduces the compiled program code size by up to 40 percent.

Unfortunately, though, Microsoft does not normally allow the BASRUNG.EXE module to be distributed with programs developed with the BASIC compiler. This means that if you write a program, compile it on the Microsoft compiler and sell it, you must pay Microsoft a royalty to use the runtime module.

Luckily, Microsoft offers a way of "integrating" the routines that are in the BASRUNG.EXE file into your compiled program. To specify this option, you use the /O compiler switch which tells the compiler to load all of the subroutines in BASRUNG.EXE that are used in your compiled program into the program at link time. While this makes the program much larger, the resulting program can be distributed and executed by itself without paying Microsoft royalties for the use of the runtime library.

If the /O option is used, be aware that the CHAIN, COMMON and CLEAR instructions are no longer supported by the compiler. This might mean that some programs need additional changes to work with the /O switch.

Once you have entered in the filenames and any compiler switches that you are going to use, the compiler proceeds to compile the program. During compiling, the compiler will report any errors that it finds on the screen along with the line the error was found on. If the error is designated as a warning error, the error can generally be ignored. If the error is severe, the problem should be delt with and the program recompiled before it is executed.

After compiling, the .OBJ file created by the compiler needs to be converted into an .EXE file before the program can be executed by DOS. To do this, type LINK followed by the name of the compiled program, a plus (+), and the names of any machine language programs that are to be used by the program. All names specified after LINK should not contain any extentions. For example, if you wanted to link the compiled BASIC program TEST.OBJ with the machine language subroutine library SUBS.OBJ, you would enter LINK TEST+SUBS. If no machine language subroutines are used by the BASIC program (horrible thought, isn't it), just type the program name (LINK TEST).

When you press ENTER, the linker asks you a set of questions. In most cases, you can ignore these questions and press ENTER for each one.

Once all the questions are answered, the linker utility merges the compiled program, the subroutine libraries in the BASIC compiler, and any machine language programs you use in the BASIC program into a single .EXE file. When the linking process is complete, the resulting program can be executed by entering the filename at the MS-DOS prompt.

That's all there is to compiling. I know it may seem like a lot at first, but once you do it a few times, it becomes quite easy. Just remember, all the extra work is worth it when you consider how much faster your programs will run.

Compiling *DBI1*

To "kill two birds with one stone" (so to speak), I will now describe how to compile the *DBI1* database system presented in last month's Subroutine City. Hopefully, this will not only result in a compiled version of *DBI1* but will also get you used to the compiling process.

First, the machine language access subroutine used in *DBI1* needs to be assembled into an .OBJ file. Listing 4 contains the complete source for the new machine langauge access routine which should be entered with EDLIN, a word processor, or a text editor and assembled with *The Microsoft Macro Assembler*. The resulting .OBJ file from the assembler will be referred to as BIOS.OBJ for the rest of this article.

If you do not have an assembler, BIOS.OBJ is included with the *DBI1* database system on PCM On Disk. If you have this disk, you can skip assembling the program.

Next, enter BASIC, load the MAIN.BAS module of the database and delete lines 25, 50, 51, 52, 53205, 64000 and 65000. These deletes remove the code used to support loading and finding the machine language subroutine used by the interpreted BASIC version of *DBI1*. In addition, lines 64000 and 65000 are deleted since they contain commands that are not supported by the compiler.

After the deletes have been performed, change Line 53210 to read:

```
53210 CALL BIOS(I,AX%,BX%,CX%,
DX%,BP%,SI%,DI%,SW%):RETURN
```

(Note: the '!' was removed after the word BIOS*)*

Change Line 53705 to read:

```
53705 V!=VARPTR(A$):A!=PEEK
(V!+2)+PEEK(V!+3)*256:GOSUB
53600:DX%=A%:RETURN
```

(Note: the offsets inside the PEEK instructions were changed)

This last program change compensates for the extra byte used by compiler BASIC to store a string's variable descriptor.

After all of these changes have been made, save the program on disk using the command SAVE"MAIN.BAS",A. This will save the module on disk in ASCII format for the compiler.

Next, repeat the above steps for the rest of the modules in *DBI1* (DBFORM.BAS, DATAMAN.BAS and PRINT.BAS).

Once all the BASIC programs have been modified and saved in ASCII format, exit to DOS by using the SYSTEM command and type BASCOM to load the BASIC compiler. The first question the compiler asks is for the source filename. For this, type MAIN (the .BAS extension is assumed), a space and /X. The /X option tells the compiler that all of the error handling capabilities of GW-BASIC are used by the program and that the extra code needed to support these routines must be included in the compiled program. After you press ENTER for the first prompt, you should press ENTER for the remaining two prompts since they should default to the values you want.

After all the questions have been answered, the compiler will compile the program, report that no errors occurred (hopefully), and return to DOS. If that is not what happens, look at the errors you received and make sure that the program was entered correctly.

Once at the MS-DOS prompt, repeat

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the compiling process for the remaining modules (DBFORM.BAS, DATAMAN.BAS and PRINT.BAS). When compiling PRINT.BAS, however, use both the /X and /S options instead of just the /X option. The /S is needed since PRINT.BAS is so large that it cannot be compiled in the computer's memory.

When compiling all these programs, you will probably run into problems with disk space since the compiler, the BASIC programs, and their compiled counterparts all tend to be quite large. If you are running on a one- or two-disk Tandy 1000, you will probably need to use at least two disks. To help relieve some of the disk usage, you can delete the .BAS source file for each module after it has been compiled.

Once all the programs have been compiled, you must link the compiled module and the machine language subroutine previously assembled into a single executable .EXE file. For the first *DB11* module, type LINK MAIN+BIOS (LINK.EXE must be on the current disk), and press ENTER for all the questions. Like everything else, this process should be repeated for DBFORM.BAS, DATAMAN.BAS and PRINT.BAS.

After all of these steps have been taken, you should end up with MAIN.EXE, DBFORM.EXE, DATAMAN.EXE and PRINT.EXE on your disk. Also, before executing any of these modules, make sure that BASRUNG.EXE and the database's CDBASE.PTR file is on the current disk.

To run the database, type MAIN at the MS-DOS prompt and enjoy your new high speed database system.

The New Machine Language Access Subroutine

Throughout this article, I have made reference to a new machine language access routine. You are probably wondering, "what does the new machine language access subroutine do that the old one didn't?"

Actually the answer to that question is *nothing*. The new machine language subroutine is basically a duplicate of the original subroutine. The only difference between them is that the new one preserves the BP register and the new one can be compiled.

The BP register is saved for two reasons. First, while interpreted GW-BASIC does not usually mind if you destroy BP, it can, in some rare instances, hang up the computer. While the occasion is rare, I felt that adding the two bytes of code was worth the extra reliability. Also, since GW-BASIC requires that BP be saved, I added the extra PUSH and POP to allow for compiler compatibility.

The other change in the machine language access subroutine is that the interrupt number used to access each MS-DOS function by the subroutine is no longer modified by BASIC. In the old version, a MID$ instruction was used to modify the machine language subroutine to access the desired MS-DOS function interrupt. Unfortunately, since compiler BASIC does not support this kind of self-modifying code, I had to find another alternative.

The alternative I chose was to add the interrupt as another parameter to the CALL and to perform the program modification in machine language. While this may seem to be an easy solution, it actually isn't.

The problem comes in when the machine language program must modify itself. Since the code is supposed to be 100 percent relocatable, there is no way of knowing where the machine language subroutine is going to be loaded in memory. If you look at the source for the machine language access subroutine in Listing 4, you can see what I did to alleviate this problem. Basically, I had the machine language subroutine CALL a dummy subroutine inside of itself. The only function of this dummy subroutine was to return back to the instruction after the CALL. You are probably thinking that that is a useless subroutine. Actually, it is the key to the self-modifying code. When the CPU executes a CALL, it places the address of the instruction following the CALL on the stack. Then, when a RET is executed, the CPU jumps to the address on the stack and double increments the stack pointer. After the CALL/RET sequence has been executed, the address of the instruction after the CALL is still in the word just before the current stack pointer value. This address can then be used to find out where the program is in memory and thus allow the machine language subroutine to modify itself.

If you look at the code in Listing 4, you will see that I also disable interrupts before performing this operation. This is done to insure that an interrupt is not executed during the process, which would destroy the memory below the current stack pointer.

This method for finding the address of a machine language program in a relocatable environment is by far the smallest and easiest to use. If you are creating your own machine language programs for the compiler and need to perform self-modifying code, I would suggest that you use this method.

Notes on Past Subroutine City Articles

To use this new machine language subroutine with the subroutines presented in the last few installments of Subroutine City (August 1985 through December 1985), enter the code in Listing 3 into the existing subroutine code.

If you wish to compile any of these subroutines, delete lines 20, 4010, 50000, 50001 and 50002. Also, remove the '!' in Line 40020 (like Line 53210 in *DB11*) and change Line 32010 to read:

```
32010 V!=VARPTR(A$):A!=PEEK(V!
+2)+PEEK(V!+3)*256:GOSUB 31000
:DX%=A%:RETURN
```

The assembled .OBJ file for Listing 4 needs to be linked to any machine language programs that use the machine language access subroutine.

One last note to any non-Tandy 2000 readers of this column. All of the subroutines presented last year in Subroutine City were designed to run on the Model 2000. Any of the subroutines that use any machine language, though, should run on any MS-DOS machine.

Unfortunately, any of the subroutines that use the keyboard require slight modifications for non-2000 machines since the Tandy 2000 returns different ASCII values for the arrow keys and other special control keys. Fortunately, the only programs that have problems with this are the demo programs that accompany the directory read subroutine and disk zap subroutines, and the full screen editor and advanced input subroutines presented in the first installment of Subroutine City.

A version of the full screen editor, the advanced input routine and another input routine that will run on all Tandy MS-DOS machines is given in the DB11.BAS module of *DB11* presented in last month's Subroutine City. In addition, this subroutine package also includes quite a few very useful subroutines that work on any MS-DOS machine.

As for the directory read and disk zapper subroutines, their demo programs can be converted to run on a Tandy 1000, 1200 or 3000 by changing the ASCII values associated with each key command.

The Future of Subroutine City

From this article forward, all of the

programs presented in this column will be compatible with all Tandy MS-DOS systems. Since I now have a Tandy 3000, I will be able to check each program more thoroughly for differences between the 2000 and 1000, 1200 and 3000.

Also, all future subroutines will be checked for compatibility with the GW-BASIC compiler. This means that each month's subroutine will run "as is" with the compiler or will run with the changes specified in the article. This will provide greater support for those using compiler BASIC on their systems.

Lastly, Subroutine City will continue to provide machine language subroutines for BASIC for at least the next three months. So far, I am planning ISAM subroutines and a high speed machine language sort subroutine for the next articles (I hope). I am also hoping to have another big program like *DBII* full of useful subroutines for the late summer or early fall issues of PCM.

If you have any subroutines or machine language programs that you need for your own application or would just like to see in this column, drop me a note and I will see what I can conjure up. Also, if you have any questions on any of Tandy's computers, drop me a note with a self-addressed, stamped envelope and I will try to answer your questions. □

Listing 1:
Changes for all *DBII* modules

```
25 RESTORE 5Ø:FOR X=1 TO 118:READ A:BIOS$=BIOS$+CHR$(A):NEXT:X!=FRE(BIOS$)
5Ø ' Program:biosd          Length: 118 bytes
51 DATA 85,139,236,25Ø,232,11Ø,Ø,139,118,254,251,139,94,22,139,31,46,136, 92,56,
139,94,6,255,55,157,139,94,8,139,63,139,94,1Ø,139,55,139,94,14,139,23, 139,94,16
,139,15,139,94,2Ø,139,7,139,94,18,139,31,139,11Ø,12,139,11Ø,Ø,2Ø5,33,85,83
52 DATA 139,236,139,94,1Ø,156,143,7,139,94,12,137,63,139,94,14,137,55,139,94,18,
137, 23,139,94,2Ø,137,15,139,94,24,137,7,91,139,11Ø,22,137,94,Ø,139,11Ø,16,91,13
7,94 ,Ø,93,2Ø2,18,Ø,195
527Ø5 I=22:AX%=Ø:GOSUB 532ØØ:DEF SEG:A=PEEK(VARPTR(AX%)):A$=CHR$(A):DEF SEG:SC=P
EEK(VARPTR(AX%)+1):RETURN
532Ø5 XV=VARPTR(BIOS$):BIOS!=PEEK(XV+1)+PEEK(XV+2)*256
5321Ø CALL BIOS!(I,AX%,BX%,CX%,DX%,BP%,SI%,DI%,SW%):RETURN
537Ø5 V!=VARPTR(A$):DEF SEG:A!=PEEK(V!+1)+PEEK(V!+2)*256:GOSUB 536ØØ: DX%=A%:RET
URN
5451Ø LOCATE 25,1,Ø:PRINT LEFT$(SP$,8Ø);:RETURN
54615 COLOR FD,BD:RETURN
```

Listing 2:
Individual module changes

Changes to MAIN.BAS

```
2Ø DIM UC(255),SN$(255),RD$(2,255),ST$(255),RE(255),QN(255)
22 DIM FS$(1),TP$(8),FT$(1),J(4),RI$(2)
```

Changes to DBFORM.BAS

```
15 DIM PX(255),PY(255),SF(255),S$(25),T(255),F$(255),L(255)
2Ø DIM UC(255),SN$(255),RD$(2,255),SL(255)
22 DIM RS$(25),N$(255),FS$(1),TP$(8),FT$(1),J(4),RI$(2)
3Ø2Ø LOCATE 11,15:PRINT"Which drive contains the new database to select?";
7Ø4Ø I$="":XF=1:COLOR FH,BD:GOTO 711Ø
15Ø1Ø IF ND THEN GOSUB 557ØØ:GOTO 6ØØ
```

Changes to DATAMAN.BAS

```
15 DIM A$(255),B$(255),T(255),F$(255),L(255),X(255),SP(255)
2Ø DIM UC(255),SN$(255),RN$(255),RD$(2,255),ST$(255),RE(255),QN(255)
22 DIM N$(255),FS$(1),TP$(8),FT$(1),J(4),F2$(255),T2(255),L2(255),RI$(2)
3Ø15 CLS:GOSUB 543ØØ:PRINT TAB(25)"-=*=- Organize database -=*=-":GOSUB 543ØØ:I$
=""
7Ø2Ø LOCATE 11,19:PRINT"Which drive contains the source database?";
5Ø8ØØ ' *** Read directory
5Ø8Ø5 I=33:A$=LEFT$(SP$,43):GOSUB 537ØØ:AX%=6656:GOSUB 532ØØ
5Ø81Ø AX%=19968:CX%=Ø:PN$=D$+":*.FLD"+NL$:SWAP PN$,A$:GOSUB 537ØØ:SWAP PN$,A$:GO
SUB 532ØØ:N=Ø:E=AX%:IF E>Ø THEN RETURN
5Ø815 N=N+1:X$=MID$(A$,31):N$(N)=LEFT$(X$,INSTR(X$,".")-1)
5Ø82Ø AX%=2Ø224:GOSUB 532ØØ:E=AX%:IF E=18 THEN E=Ø:RETURN ELSE 5Ø815
```

Changes to PRINT.BAS

```
15 DIM A$(255),B$(255),T(255),F$(255),L(255)
515Ø LOCATE 11,(8Ø-LEN(OD$(X)))/2,Ø:PRINT OD$(X);:GOTO 5Ø7Ø
14932 XY=CVI(LEFT$(RD$(1,RF(XF)),2)):XM=ASC(MID$(RD$(1,RF(XF)),3,1)): XD=ASC(RIG
HT$(RD$(1,RF(XF)),1)):PRINT #4,USING FD$;RIGHT$(ZF$+MID$(STR$(XM),2),2); "-";RIG
HT$(ZF$+MID$(STR$(XD),2),2);"-";RIGHT$(ZF$+MID$(STR$(XY),2),4):GOTO 1495Ø

DELETE 511ØØ-511Ø5
```

Listing 3:
Changes to MS-DOS access subroutine

```
2Ø RESTORE 5ØØØØ:FOR X=1 TO 118:READ A:BIOS$=BIOS$+CHR$(A):NEXT:X!=FRE(BIOS$)
4ØØ1Ø XV=VARPTR(BIOS$):BIOS!=PEEK(XV+1)+PEEK(XV+2)*256
4ØØ2Ø CALL BIOS!(I,AX%,BX%,CX%,DX%,BP%,SI%,DI%,SW%):RETURN
5ØØØØ ' Program:BIOS          Length: 118 bytes
5ØØØ1 DATA 85,139,236,25Ø,232,11Ø,Ø,139,118,254,251,139,94,22,139,31,46,136,92,5
6,139,94,6, 255,55,157,139,94,8,139,63,139,94,1Ø,139,55,139,94,14,139,23,139,94,
16,139,15,139,94,2Ø, 139,7,139,94,18,139,31,139,11Ø,12,139,11Ø,Ø,2Ø5,33,85,83
5ØØØ2 DATA 139,236,139,94,1Ø,156,143,7,139,94,12,137,63,139,94,14,137,55,139,94,
18,137, 23,139,94,2Ø,137,15,139,94,24,137,7,91,139,11Ø,22,137,94,Ø,139,11Ø,16,91
,137,94 ,Ø,93,2Ø2,18,Ø,195
```

Listing 4:
MS-DOS Access Subroutine Source Code

```
          PAGE    6Ø,132
          TITLE   MSDOS Function call Accesser ** By Robert D. Covington
 CODE     SEGMENT
          ASSUME  CS:CODE
          PUBLIC  BIOS
 BIOS     PROC    FAR
          PUSH    BP      ;Save BASIC's BP
          MOV     BP,SP   ;Make BP base pointer of stack
 ;
 ; *** Self modifying code logic
 ;
          CLI             ;Disable interrupts
          CALL    DCALL   ;Perform a CALL to find address
          MOV     SI,[BP-2]       ;Get address of ML subroutine
          STI                     ;Re-enable interrupts
          MOV     BX,[BP+22]      ;Get selected interrupt number
          MOV     BX,[BX]
          MOV     CS:[SI+56],BL   ;Modify code
 ;
 ; *** Variable to register transfer code
 ;
          MOV     BX,[BP+6]       ;Get descriptor for SW variable
          PUSH    [BX]    ;Move SW,[BX]
          POPF
          MOV     BX,[BP+8]       ;Get descriptor for DI variable
```


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```
        MOV     DI,[BX] ;Put variable in DI
        MOV     BX,[BP+1Ø]      ;Get descriptor for SI variable
        MOV     SI,[BX] ;Put variable in SI
        MOV     BX,[BP+14]      ;Get descriptor for DX variable
        MOV     DX,[BX] ;Put variable in DX
        MOV     BX,[BP+16]      ;Get descriptor for CX variable
        MOV     CX,[BX] ;Put variable in CX
        MOV     BX,[BP+2Ø]      ;Get descriptor for AX variable
        MOV     AX,[BX] ;Put variable in AX
        MOV     BX,[BP+18]      ;Get descriptor for BX
        MOV     BX,[BX] ;Put variable in BX
        MOV     BP,[BP+12]      ;Get descriptor for BP
        MOV     BP,[BP]         ;Put variable in BP
;
; *** Execute MSDOS function
;
        INT     21H     ;Execute DOS function call
;
; *** Register to variable transfer code
;
        PUSH    BP      ;Save BP for later
        PUSH    BX      ;Save BX for later
        MOV     BP,SP   ;Make BP base of stack
        MOV     BX,[BP+1Ø]      ;Get descriptor for SW variable
        PUSHF           ;MOV [BX],SW
        POP     [BX]
        MOV     BX,[BP+12]      ;Get descriptor for DI variable
        MOV     [BX],DI ;Save DI in variable
        MOV     BX,[BP+14]      ;Get descriptor for SI variable
        MOV     [BX],SI ;Save SI in variable
        MOV     BX,[BP+18]      ;Get descritor for DX variable
        MOV     [BX],DX ;Save DX in variable
        MOV     BX,[BP+2Ø]      ;Get descriptor for CX variable
        MOV     [BX],CX ;Save CX in variable
        MOV     BX,[BP+24]      ;Get descriptor for AX variable
        MOV     [BX],AX ;Save AX in variable
        POP     BX      ;Restore BX
        MOV     BP,[BP+22]      ;Get descriptor for BX variable
        MOV     [BP],BX ;Save BX in variable
        MOV     BP,[BP+16]      ;Get descriptor for BP variable
        POP     BX      ;Put old BP in BX
        MOV     [BP],BX ;Save BP in variable
        POP     BP      ;Restore BASIC's BP
        RET     18      ;Return fixing for 9 parameters
DALL:
        DB      ØC3H    ;Return Near
BIOS    ENDP
CODE    ENDS
        END
```

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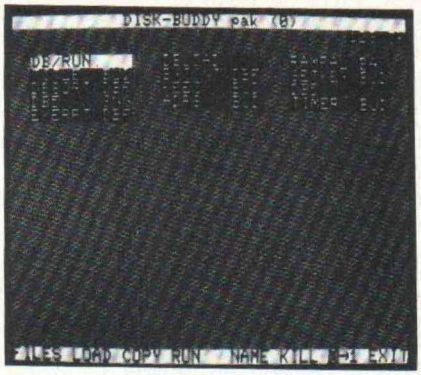

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What *Are* All Those Strange MS-DOS Commands, Anyway?

By William Barden, Jr.
PCM Contributing Editor

Here you go, Mr. Barden," the postman said, handing me a stack of magazines, brochures, bills, free samples and envelopes. "This stuff was too big for your mailbox. If this keeps up, I'm afraid we'll have to ask you to cut down on your subscriptions to computer magazines," he grumbled.

"Yeah, sorry — maybe I'll just stick to PCM and RAINBOW and forget about *Computers and Electronics, Creative Computing* and *Popular Computing*," I smirked.

I carried the stack into the house and started paging through it. Humm . . . brochure from Computing Clearinghouse offering Timex 1000s for $12.95 . . . latest copy of More Computer Supplies Catalog listing a 10 pack of diskettes on sale for only $59.95 . . . ad from a company for fake Tandy 3000 labels to upgrade Tandy 1000s . . . ah, here's something interesting . . .

What I'd seen was advertising copy from a company called 1000 Clowns Software. According to the ad, their new *Utility Plus* package would enable a Tandy 1000 to do these things:

- Search all disk files for a given string of characters.
- Pull out all records from a file that contained three items.
- Record the date and time on listings or disk files.
- Provide an automatic copy of only those files not previously copied.
- Alphabetize directories.
- And many more (they said).

The interesting thing about this product was that every item in the list could *already* be accomplished in MS-DOS software on the Tandy 1000! Maybe you weren't aware that some of these things existed, or perhaps you had seen the MS-DOS commands, but just hadn't gotten around to using them. In this article, I'd like to show you the power of some of these commands and options, especially the power and versatility of batch files. I think you'll be able to find one or two that will really be a boon to some of your Tandy 1000, 1200, 2000 or 3000 operations.

William Barden, Jr. is a master communicator in a field in which he is one of the few recognized experts — microcomputers. A prolific author of more than 27 books on computers and computer programming, Bill also has authored several instructional software projects for Tandy/Radio Shack.

Adventures of a Different Sort

One of the neatest pieces of utility software on your Tandy 1000, 1200, 2000 or 3000 MS-DOS diskette is called SORT.EXE. We'll call it SORT for short. SORT is a "filter," meaning that it processes data that comes from a source such as keyboard or a disk file before it goes on to a destination — the display or another file. SORT operates on any ASCII (text) file, sorting the records in the file in alphabetized order.

BASIC Sorting

Suppose that you had generated a Radio Shack inventory file with a word processing program or BASIC that looked like the text in Example 1.

We've included a rule on the bottom to help you count the columns. Each line is a *record* of data consisting of three *fields*. The first field goes from Column 1 through 35 and is a description of the inventory item. The second field goes from Column 36 through 41 and is the retail price. The third goes from Column 42 through 52 and is the part number of the item.

To sort the records on the screen, you'd enter

```
A>sort < parts.txt
```

The results would be that in Example 2.

The sort program looked at the first column of each record and sorted the entire file before displaying the data on the screen. The MS-DOS command SORT told MS-DOS to search for the SORT.EXE program; MS-DOS assumes that the filespec extension would be .EXE, .COM, or a few other allowable extensions.

To sort the list in reverse, the /R option can be used:

```
A>sort /r < parts.txt
```

The results are shown in Example 3.

Another option that can be used is to specify the field for the sort. If you had wanted a list that was sorted by part number instead of description, you could have done this:

```
A>sort /+42 < parts.txt
```

The results are in Example 4.

Redirection

As nice as the sort is, though, it's made a lot more useful by the ability to *redirect* standard input and output of a command. Instead of output of a command result going to the screen, for example, you can specify that the output goes to a file.

Taking that last example, again, if you had said:

```
A>sort /+42 partsalp.txt
```

MS-DOS would have sent the alphabetized list to file PARTSALP.TXT rather than the screen. Listing the file with TYPE would then display the alphabetized list as before. The "greater-than" character (>) indicates that output is to go to the device after it, whether it's a file, line printer (PRN) or console screen (CON).

The less-than symbol (<) indicates that input to the sort filter comes from the PARTS.TXT *file*. The default for input is from the keyboard, which is not as often used. In the keyboard case, no less-than symbol is required (see Example 5).

The MS-DOS SORT command is very handy for general sorting of text data, in any field. It can also be used to do multiple-field sorting. For a long file, you could say something like the commands in Example 6, which would sort the file first by price, then by description, and then by part number. The final sort would be in file ZZZZZ3.

Directory Listings and the Sort Piping

An obvious use for SORT is to use it on disk directories, which tend to be long, disorganized and confusing, especially when you have many diskettes or a hard disk.

This command,

```
A>dir¦ sort
```

for example, sorts the directory listing of the current disk (A:) and displays it on the screen. The ¦ symbol (vertical bar) indicates that the output of one command is not to a disk file, but to the *input* of another command. (Really, what we're talking about here when we mention commands is *programs*, as many commands are represented by separate MS-DOS program modules.) This redirection is called "piping."

More MS-DOS

The MS-DOS masses cried for more MS-DOS convenience and that's what they got. One of the conveniences is the MORE filter (MORE.COM on your disk). It's difficult to read at the rates text is displayed on the screen, and the MORE command allows you to read only a screen full of text at a time. This command:

```
A>dir¦ sort¦ more
```

not only alphabetizes the directory listing, but displays it a screen-full at a time, like Example 7.

Pressing any key now displays the next page of the data on the screen. MORE is another handy filter to use any time you don't want a large volume of text whizzing by on the screen.

Example 1

```
A>type parts.txt

Vacuum tubes, assorted                    19.95     23-6781
Archer "Goodbuddy" 3Ø-channel CB          49.95     2Ø-4567
Book, "How to Use Your Model I"            4.95     26-7899
Toy, Halloween II Meat Ax                  3.95     19-6749

12345678911234567891123456789112345678911234567891I12
```

Example 2

```
Archer "Goodbuddy" 3Ø-channel CB          49.95     2Ø-4567
Book, "How to Use Your Model I"            4.95     26-7899
Toy, Halloween II Meat Ax                  3.95     19-6749
Vacuum tubes, assorted                    19.95     23-6781
```

Example 3

```
Vacuum tubes, assorted                    19.95     23-6781
Toy, Halloween II Meat Ax                  3.95     19-6749
Book, "How to Use Your Model I"            4.95     26-7899
Archer "Goodbuddy" 3Ø-channel CB          49.95     2Ø-4567
```

Example 4

```
Toy, Halloween II Meat Ax                  3.95     19-6749
Archer "Goodbuddy" 3Ø-channel CB          49.95     2Ø-4567
Vacuum tubes, assorted                    19.95     23-6781
Book, "How to Use Your Model I"            4.95     26-7899
```

Example 5

```
A>sort /+42
Archer "Goodbuddy" 3Ø-channel CB          49.95     2Ø-4567
etc.
```

Example 6

```
A>sort /+36 <parts.txt >zzzzz1
A>sort <zzzzz1 >zzzzz2
A>sort /+42 <zzzzz2 >zzzzz3
```

Note that in the above example, two piping symbols (|) were used to separate the MS-DOS commands. Multiple piping such as this can be done at any time.

Another Fine Batch You've Gotten Us Into, Ollie!

MS-DOS is irritating in its litany of commands! Not only are there more than enough *ordinary* commands to keep track of, but there are the three dozen permutations of SORT and MORE and a lot of other functions we haven't yet discussed. There *is* a solution to using all of these diverse commands, however — it's called a *batch file.*

In case you're wondering about where the name "batch" comes from, let me give you a little background. In the very early days of computers ('40s and '50s), the room-sized computers operated on one program at a time, and users considered themselves lucky if they completed the 8-hour computing task before the system went south. Shortly after, however, computer use became more efficient. Computing jobs were run by feeding in punched cards that represented the program and by also entering *commands* via punched card, rather than manually. Multiple jobs — a FORTRAN program, followed by Bill of Materials, followed by a COBOL compilation — were submitted in "batches" of punched cards to make efficient use of an expensive computing resource. The batch capability of MS-DOS is an offshoot of this batch processing — a complete set of commands can be defined in a single file, this time in a disk file rather than in a batch of cards.

Batch files are collections of MS-DOS commands. All commands that are normally entered from the keyboard can be entered from a batch file. The file is an ASCII (text) file, so it can be produced by a word processor or by any other means of producing a text file. Batch files have the extension .BAT to tell MS-DOS that they can be executed; it's not necessary to specify the .BAT, though, when entering the batch filename to execute the commands.

A simple batch file to sort the directory and to use the MORE filter looks like Example 8.

Here, the batch file is called DIRSM .BAT and contains a "remark" line and the commands for the sort. To execute this batch file, producing the sort that we saw above, you'd simply enter:

```
A>dirsm
```

Creating Batch Files From the Keyboard

The easiest way to produce short batch files is directly from keyboard to disk file by using the command

```
A>copy con: dirsm.bat
```

This uses the MS-DOS COPY command to copy lines from the keyboard (CON: stands for "console," another bit of historical computer jargon) to disk file DIRSM.BAT. (Here, the .BAT extension must be specified.)

After you've entered this command, the system will just sit there and stare at you, with a cursor on the line below the COPY. From that point, just enter the batch file lines, one at a time, ending each with ENTER. To end the file, press F6, or hold down the CTRL key and strike the Z key, and then press ENTER. (See Example 9.)

REMARK and ECHO Commands

The batch REM command can be put into the batch file as often as necessary. It is displayed as the batch file is executed and can be used to prompt the user.

The ECHO command controls whether or not the batch commands are displayed. If an ECHO OFF is included in the batch file, all batch commands following the ECHO OFF will *not* be displayed. When an ECHO ON is executed, the display will restart. The exception to the ECHO OFF condition, though, is an ECHO command with a message included. Example 10 is a sample batch file for copying all BASIC files from Drive A to B.

Note here that while the command itself is not displayed when echo is off, the *output* from the command *is* displayed, as was the listing of files from the COPY command here. ECHO is somewhat neater than the REM as there is no A> prompts cluttering up the display. ECHO without following text will display the state of the ECHO, ON or OFF.

```
echo
ECHO is on
```

The PAUSE Command

The batch PAUSE command is self-explanatory. It's used after a message to the user so that he or she can take or confirm some action. Pressing any key except CTRL-C causes a continue of the batch action. (CTRL-C stops the batch action at any time.) PAUSE can also have a message after the PAUSE command.

Example 7

```
       31 File(s)     58368 bytes free
 Directory of  B:\
 Volume in drive B has no label
%PIPE1   $$$        Ø   1-Ø1-8Ø   6:Ø6a
%PIPE2   $$$        Ø   1-Ø1-8Ø   6:Ø6a
ANSI     SYS     4399   1Ø-2Ø-84   1:ØØp
           .
           .
           .
KEYCNVT  SYS      2Ø2   1Ø-2Ø-84   1:ØØp
-- More --
```

Example 8

```
A>type dirsm.bat
rem This is a simple batch file
dir | sort | more
```

Example 9

```
A>copy con: dirsm.bat
rem This is a simple batch file <ENTER>
dir | sort | more <ENTER>
<F6> <ENTER>
```

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Left justified "typewriter" text option
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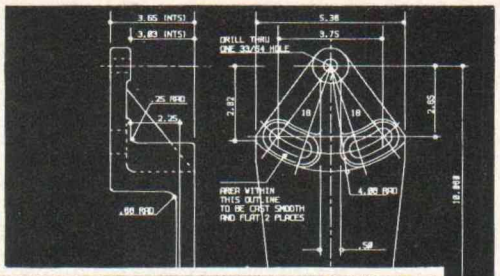
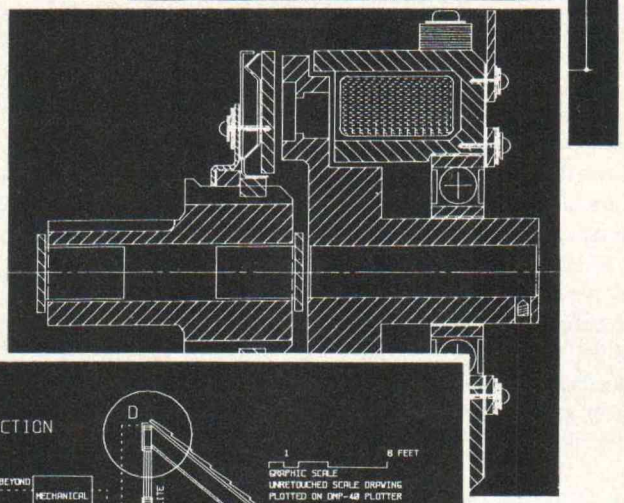
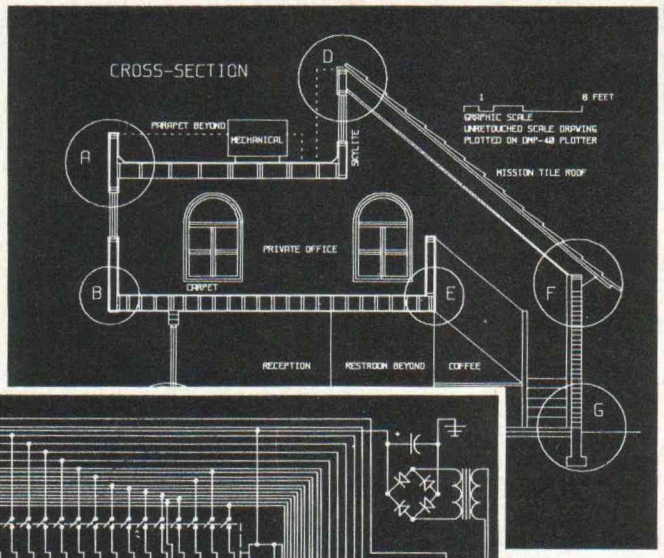
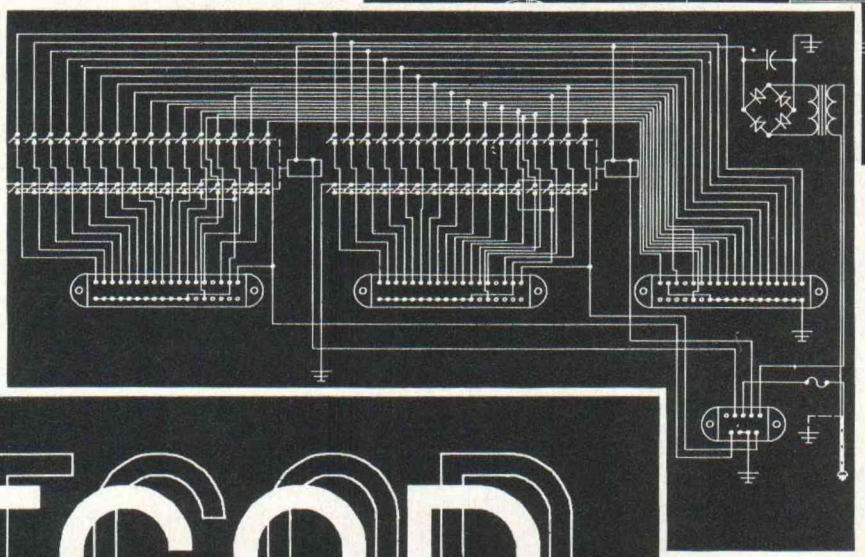
Hardcopy reduce / enlarge 1% - 9999%









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Batch Parameters

So far, we've discussed the following batch commands:

- REM — for remarks.
- ECHO — for turning display on and off and remarks.
- PAUSE — to temporarily suspend the batch operation for some manual intervention.

By themselves, these commands will allow you to construct a large number of predefined batch files that would guide a novice user in the proper sequence of steps (rem Put Disk marked "BOOKS1" in upper drive, etc. . .) or that you would find convenient simply because it's much easier to remember DIRSM than DIR ¦ SORT /+5 ¦ MORE. However, in addition to these batch commands, there are four more that come in handy. They are:

- IF — To test a condition.
- GOTO — To alter the path of the batch commands.
- FOR — To set up repeat of commands.
- SHIFT — To allow many command parameters.
- SET — To change command parameters.

In fact, these commands actually define a mini "programming language" that allows you to construct short, useful operating system programs. To understand how these four commands work, you need to know about *replaceable parameters.*

When a batch file is referenced by entering the name of a batch file, it's possible to include up to 10 *parameters* for use in the batch file. These parameters can be filespecs or simply text strings. They can't include embedded blanks, as blanks are used to separate (delimit) one parameter from the next. Example 11 is a typical set of parameters:

There are two parameters here, AT120985.PCM and AT111085.PCM. Within the batch file the parameters are referenced by the symbols %0, %1, %2, %3, %4, %5, %6, %7, %8 and %9, corresponding to the position in the line, with %0 always representing the batch filespec itself. In this example we'd have:

```
%0 = SWAP
%1 = AT120985.PCM
%2 = AT1110885.PCM
%3 - %9 = nothing
```

Another example can be found in Example 12.

In other words, all MS-DOS does is to substitute the parameter for the "dummy" parameter of %0 through %9 in the guts of the batch file.

The example before this, SWAP.BAT, a batch file that would swap two filenames, would look like Example 13 in expanded form.

In this case MS-DOS substitutes PROG1.BAS every time it sees %1 and PROG2.BAS every time it sees %2. The REN (rename) commands become

```
REN PROG1.BAS ZZZZZ1
REN PROG2.BAS PROG1.BAS
REN ZZZZZ1 PROG2.BAS
```

The ZZZZZ1 file, by the way, is simply a dummy file that is used for temporary storage.

The IF Command

The batch IF command allows you to test one of the replaceable parameters

Example 10

```
echo off
echo          *****COPYB*****
echo Will copy all basic files from drive a: to b:
echo Put source diskette in drive a:, destination
echo diskette in drive b: and press any key.
pause
copy a:*.bas b:
echo on
rem  All done
```

The output from this batch file will look like this:

```
          *****COPYB*****
Will copy all basic files from drive a: to b:
Put source diskette in drive a:, destination
diskette in drive b: and press any key.
Strike a key when ready . . .
A:AT1Ø281.BAS
A:AT1Ø812.BAS
A:AT1Ø283.BAS
        3 File(s) copied

A>rem  All done
A>
```

Example 11

```
A>SWAP AT12Ø985.PCM AT111Ø85.PCM
```

Example 12

```
echo off
echo This is a short batch file called %Ø.BAT
echo %9 %8 %7 %6 %5 %4 %3 %2 %1 %Ø
```

Executing this batch file by

```
A>TEST Now is the time for PROG1.BAS all good men
```

would display

```
A>echo off
This is a short batch file called TEST.BAT
men good all PROG1.BAS for time the is Now TEST
```

and then to alter the sequence of the batch file commands. Without an IF, batch files would consist only of a series of statements to be executed one after another, and that sequence would never change.

Both a string comparison and a file comparison can be made with IF. The file comparison is shown in the modification of SWAP in Example 14.

The first thing you'll notice after the IFs is that there are some strange looking names with colons in front of them. These names are IF/GOTO *labels*. After all, if you're going to alter the path of execution in the batch file, you must specify where the next batch command is, and the labels define those locations. Labels can be one to eight characters and are never displayed during batch file execution.

Either the GOTOs or IFs cause the path of execution to be altered. The IFs are similar to BASIC IF . . . THEN statements, while the GOTOs are similar to BASIC GOTOs.

The IF commands test to see whether a file EXISTS or does NOT EXIST. In this case we're trying to find an existing file that can be renamed, but also trying to check that no filename already exists with the new name to be given. Note that the filename is *after* the EXIST or NOT EXIST.

The EXIST and NOT EXIST conditions can be used often in batch files to check not only for user files specified in the parameters list, but also to see whether the program modules exist for the batch commands themselves. The commands in Example 15, for example, test whether SORT.EXE is available for a batch operation:

The second type of test that the IF statement can make is a test of equality or inequality of a string of text characters. Before looking at this, though, let's look at another MS-DOS filter, the FIND filter.

Finding Everything on Disk

The MS-DOS FIND command works through the FIND.EXE module. It searches a file for any string of characters. To find the character string "one Tandy 1000 equals ten PCjrs" in file AT101785.PCM, for example, you'd have the command and results in Example 16.

The string defined for the search must be exact — there is no compensation for the difference of upper- and lowercase characters. The string must be enclosed in double quotes.

There are several possible options in

Example 13

```
echo off
rem                  *****SWAP*****
rem Swaps the filenames of two files.
rem Do not use drive specifiers.
echo Swap %1 with %2? Press any key if yes, Ctrl,C if no
pause
ren %1 zzzzz1
ren %2 %1
ren zzzzz1 %2
echo File names swapped
echo on
```

A typical "call" would be

```
A>swap prog1.bas prog2.bas
```

and the output would look like this:

```
A>swap prog1.bas prog2.bas

echo off
Swap prog1.bas with prog2.bas? Press any key if yes,Ctrl,C if no
Strike a key when ready . . .
File names swapped
A>
```

Example 14

```
echo off
rem                  *****SWAP*****
rem Swaps the filenames of two files.
rem Do not use drive specifiers.
if exist %1 goto cont1
echo File %1 does not exist!
goto end
:cont1
if not exist %2 goto cont2
goto cont3
:cont2
echo File %2 does not exist!
goto end
:cont3
echo Swap %1 with %2? Press any key if yes, Ctrl,C if no
pause
ren %1 zzzzz1
ren %2 %1
ren zzzzz1 %2
echo File names swapped
:end
echo on
```

Example 15

```
    if exist SORT.EXE goto cont1
    echo You need the SORT.EXE module on your disk!
    goto end
    :cont1
```

this command. The /V option displays all lines that do *not* contain the string. The /C option does not display the lines, but only counts the number of occurrences of the string. The /N option displays the relative line number ahead of the line from the file.

The MS-DOS FIND command is probably even more useful than SORT, as it can be used to search directories for filenames or types of files or to search all disk files for a string, as we'll see.

To illustrate how powerful this can be when coupled with a batch file, look at Example 17. It finds all files on a disk containing a given string — even a hard disk organized with subdirectories:

This batch file is called by FINDFILE, followed by a drive specifier, followed by a string. The string might typically be .BAS, for all BASIC program files, or .SYS, for all system files.

```
>A findfile c: .BAS
```

for example, would display all files on a hard disk that were BASIC program files. MS-DOS would substitute the %2 parameter, in this example .BAS, into the FIND command to produce

```
find ".BAS" zzzzz1 | more
```

Back to the IF Command and String Comparisons

Listing 1 shows an interesting batch file that uses both the FIND command and IF string comparisons to search multiple fields in records. Suppose, for example you had records consisting of names and addresses as in Example 18.

You could use this batch file to find all Smiths that lived in Texas (TX), or to find a Smith living in Wisconsin on Oak Street. FINDMULT is called by the name, the filespec, and from one to three arguments, representing three FIND strings. If less than three arguments are used, a dash replaces the latter arguments. A typical call might be:

```
A>findmult maillist.txt Smith
WI Oak
```

More about this next time, when we continue with batch files and some hints and tricks that will amaze and amuse your friends at Tandy 1000 user group meetings. Included in next month's column will be a batch file memo pad, a date/time recorder, and batch files that will enable you to organize and list all files on your floppy or hard disks. □

Example 16

```
A>FIND "one Tandy 1000 equals ten PCjrs" AT1001785.PCM
```

FIND would search the AT101785.PCM for the string and display all lines containing the string:

```
---------- AT1001785.PCM
one Tandy 1000 equals ten PCjrs". He actually said this:
"I think one Tandy 1000 equals ten PCjrs or two PCs."
```

Example 17

```
    echo off
    rem          *****FINDFILE*****
    rem  Finds all filenames containing a given string.
    rem  Syntax: FINDFILE drive  string
    tree %1 /f > zzzzz1
    find "%2" zzzzz1 | more
```

Example 18

```
Bunzel      David   7856 71st St.  Fort Worth TX   76105
Smith       John    414 Oak        Wausau      WI   53111
.
.                                                    .
. and so forth, for hundreds of entries
```

The listing:

```
CLS
echo off
echo                        ***FINDMULT***
rem   Finds file lines in which there are several fields.
rem   Syntax:  FINDMULT filespec string1 string2 string3
rem            Use dashes if no string
if exist %1 goto next1
echo File does not exist!
goto done
:next1
find /n "%2" %1 >ZZZZZ1
if %3 == - goto done
find /n "%3" ZZZZZ1 >ZZZZZ2
if %4 == - goto done
find /n "%4" ZZZZZ2 >ZZZZZ3
:done
if %4 == - goto type2
type ZZZZZ3
goto endb
:type2
if %3 == - goto type1
type ZZZZZ2
goto endb
:type1
type ZZZZZ1
:endb
echo Done with FINDMULT
echo on
```

PCM

A Batch of New Ideas

By John B. Harrell, III

This month, I will look at two "problems" associated with the use of MENU.COM which were identified by several readers. The first problem involves depleting the MS-DOS program environment (more explanation later) and the second problem concerns the use of secondary menus.

I have been overwhelmed by the response to my *Menu* program. If you haven't received the demo disk yet and are still confused, the offer of sending me a prepaid disk and mailer is still valid.

As always, Murphy has done it again. I stated in the *Menu* articles that there was one limitation on using *Menu* but I really did not think that anyone would encounter it, and I did not elaborate on the subject. One of the very first replies to my demonstration disk was on this very topic and I now feel some further comments are required.

Environmental Problems

One reader reported receiving an obscure error message — "Out of Environment Space" — which is not documented in the Tandy MS-DOS reference manual. He was attempting to use batch files linked to the *Menu* to set complex search paths prior to running his application.

When MS-DOS is first loaded, the "Basic Input/Output System" (BIOS) is retrieved from the disk by the "Boot ROM" and executed. The initialization phase of this code is responsible, among other things, for loading the MS-DOS system. Once MS-DOS is loaded, part of its initialization code is responsible for loading and executing the DOS command processor (COMMAND.COM).

The command processor constructs a programming "environment" table consisting of information such as its location and the current path. This area may be as large as 32K, however, it is usually limited to around 128 bytes. A pointer to this environment table is established for each program executed for the DOS command prompt.

This is where *Menu* and our limited space problem come into play. You may change any of the information in this copy of the environment table but you cannot extend its length beyond that established by COMMAND.COM prior to executing the program.

A program executed from the DOS prompt is generally known as the "*parent process*" and may execute other programs generally called "*child process*." This is how *Menu* works. In writing the code for *Menu*, I made the decision to only pass the environment's pointer to the child process. This means you are working *on a copy* of the environment constructed by COMMAND.COM. This is an important concept to understand.

In plain English, this means you can do anything to the environment in the child process. All will be forgotten and returned *exactly* to the starting state when the child process terminates. Within bounds of the original environment, here's how we get around the limitation encountered by a few readers.

In my first article text, I provided a sample AUTOEXEC file that set a long path name and a long command prompt string. You can redefine this path name to whatever you desire in the batch file and it will automatically be reset when you exit back to the menu. Similarly, you can release the prompt string space by entering the DOS command PROMPT and pressing ENTER to return the prompt to the familiar A> and it will be restored when the child process is terminated.

The key point here is that I reserved space for these features of the system by installing them as the first commands executed by the system on startup. If

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you find you need more space than this normally reserves, set up a "dummy" environment variable with a string to reserve the space and release it in your batch files. The commands are:

```
SET DUMMY=01234567890123456789
  01234567890ENTER
SET DUMMY=ENTER
```

This first sets an environment variable DUMMY to a string containing 30 characters. The second command totally releases this string space and removes the name DUMMY from the environment table, freeing up a total of 37 bytes of space (five for the name, one for the equal sign (=), 30 for the string and one for the 00H terminator byte).

I think this will solve most of those problems but Murphy could strike twice. If you think this particular "brand of lightning" is leaking through your surge suppressor, write to me and provide the specifics of your problem. Send me a self-addressed, stamped envelope with your letter for the reply. I will gladly answer all requests concerning *Menu*'s operation.

Menus, Menus and More Menus

The second inquiry concerned using a second (or third) level of *Menu*. I really did not anticipate this in my original program design. It is easy to completely fill a 10-megabyte hard disk while attempting to install 10 useful applications for *Menu*. My IBM-PC is continually on a "diet" to maintain approximately 10 to 15 percent free space on the disk.

Changing *Menu* (and MENUINST.BAS) to accommodate this will require some radical changes in a few areas. If you have not obtained the assembly source code, these changes will not be possible. If you have, follow the ensuing discussion and I will point out areas that require change.

First, you must add a new "permanent" menu option allowing a full

Figure 1

Two-Level Sub-Menu Batch Files

A.BAT

```
echo off
cls
echo
echo This is a test of the sub-menu options from a batch file
echo
echo Two options are currently available:
```


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```
echo
echo        1. Assigned task number 1
echo
echo        2. Assigned task number 2
echo
echo Answer the following question with a "Y" or an "N" for the
option
echo you choose to execute.  Do you want to execute option 1:
yesno
if errorlevel 1 goto yanswer
noption
:yanswer
yoption
```

NOPTION.BAT

```
echo off
cls
echo You have selected the "No" or second option on the sub-menu
echo previously displayed.
echo
pause
```

YOPTION.BAT

```
echo off
cls
echo You have selected the "Yes" or first option on the sub-menu
echo previously displayed.
echo
pause
```

terminate and exit from *Menu*. You can currently do this by using the CTRL-C or CTRL-BREAK combination (only if BREAK is enabled using the DOS command or the CONFIG.SYS command). This revision requires changing the text of the displayed menu options, changing the coding in the main program loop and changing the option display loop.

Second, you must make changes to the installation program to accommodate these new "permanent" options. This is really too hard; especially when you consider the memory costs for each level of menus. Each menu structure loaded requires a separate copy of MENU and COMMAND.COM. This requires about 24K for each menu level — not too much by today's standards, but it is significant and must be considered.

An easier solution would be to use limited batch files for these sub-menus and this is the crux of the second problem. In previous applications, these batch menus would display some text and exit to the DOS command level to await your entry. This entry would subsequently execute the correct batch file to carry out the task. This process was required because MS-DOS lacks a *very important feature*: the ability to ask for and receive user input during batch execution.

Figure 2 Three-Level Sub-Menu Batch Files

B.BAT

```
echo off
cls
echo
echo This is a test of the sub-menu options from a batch file
echo
echo Three options are currently available:
echo
echo        1. Assigned task number 1
echo
echo        2. Assigned task number 2
echo
echo        3. Assigned task number 3
echo
echo Answer the following menu option prompt with the appropriate
echo option number:
123opt
if errorlevel 3 goto 3opt
if errorlevel 2 goto 2opt
:1opt
1
:2opt
2
:3opt
3
```

1.BAT

```
echo off
cls
echo You have selected the first option on the sub-menu
echo previously displayed.
echo
pause
```

Attempting to end a batch file and wait for user input will not work if the batch file was executed from *Menu*. When I cause the appropriate menu option to be executed, I load a second version of COMMAND.COM to process the batch commands and then tell it what batch file to execute. In the parameters to COMMAND.COM, I have not specified that it must remain permanently resident, so it terminates and returns to *Menu* when the batch file is done.

Look at Figures 1 and 2. These are examples of a two-level sub-menu and a multiple-level (three) sub-menu. The two very short programs used in these batch files display an appropriate message, ask the user for a proper input, and post this result to the operating system as an error code return from a child process.

This error code can be examined by the batch procedure using the DOS IF command and the special condition — ERRORLEVEL. The command syntax is as follows:

IF [NOT] *condition command*

This means that the command will be executed if the condition is evaluated as "true." In my example, I compare the

```
                    2.BAT
echo off
cls
echo You have selected the second option on the sub-menu
echo previously displayed.
echo
pause

                    3.BAT
echo off
cls
echo You have selected the third option on the sub-menu
echo previously displayed.
echo
pause
```

Figure 3

Creating YESNO.COM

```
 (22:16:Ø1) B:\pcm> debug yesno.com
File not found;Disregard error message
-alØØ;Begin assembly at address ØlØØ
XXXX:ØlØØ mov ah,9;Set function call = display str
XXXX:ØlØ2 mov dx,llf;Set message address
XXXX:ØlØ5 int 21;Issue MS-DOS function request
XXXX:ØlØ7 mov ah,8;Set function = get keystroke
```


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DOS error code (ERRORLEVEL) to a known condition. DOS will execute the command (a GOTO command) if the error code is *greater than or equal to the specified value.* This last distinction is important and must be considered when writing batch files as this ultimately determines the order of the conditional statements.

You may nest the batch procedures to any level as long as the last command executed in a batch file is the name of the next batch file. In other words, you cannot return to the calling batch file. When the last batch command has been executed, COMMAND.COM will still terminate and return you to *Menu.*

Now, let's examine the two short programs contained in figures 3 and 4. These programs perform the simple task of displaying a prompt message, asking for your response, and returning a coded value to the operating system. This value is established as the value of the ERRORLEVEL condition that may be tested by the DOS commands.

Program YESNO allows the operator to respond with either a Y or N character signifying "yes" and "no" respectively. The "yes" response is coded with a return value of one and the "no" response has a value of zero. Enter the program exactly as listed in Figure 3 (ignoring the comments, of course) and save it to the disk.

The second program in Figure 4 is shorter but the logic is much more flexible and complex. This routine allows you to press a single digit key in response to the prompt. Currently, the limit is set allowing the values of one, two and three. This can easily be changed to include all 10 digits and, if you extend the logic somewhat, all key responses can be returned. The binary value of the key pressed is returned as the DOS error code.

Conclusion

Well, that's it for another month. I hope this clears up a few problems in the use of *Menu* and makes it a more productive system for you. There is a wide application for simple programs like those presented in the sub-menus. Short extensions to the disk operating system are valuable and profitable tools.

I have really appreciated your response and comments on the DOS Boot column. Please feel free to let me know of any areas you desire to learn about. In addition to writing to me, I can also be reached on CompuServe by leaving mail to 73016,1326. □

```
XXXX:Ø1Ø9 int 21;Issue MS-DOS function request
XXXX:Ø1ØB and al,df;Make sure character upper case
XXXX:Ø1ØD mov ah,4c;Set function code for terminate
XXXX:Ø1ØF cmp al,4e;Check for an 'N' = no
XXXX:Ø111 jz 11b;Yes - set return code and exit
XXXX:Ø113 cmp al,59;Check for a 'Y' = yes
XXXX:Ø115 jnz 1Ø7;No - loop until response good
XXXX:Ø117 mov al,1;Set return code
XXXX:Ø119 int 21;MS-DOS function for terminate
XXXX:Ø11B mov al,Ø; .. with the return code avail-
XXXX:Ø11D int 21; .. able for the parent process
XXXX:Ø11F db '(Y/N)? $';String to display
XXXX:Ø127;Must have one extra return here
-rcx;Set the CX register to the
CX ØØØØ; .. proper value for writing
:27; .. file to disk
-w;Issue file write
Writing ØØ27 bytes
-q;Exit DEBUG and return to DOS

 (22:21:39) B:\pcm>
```

Note: Make sure that you type only the text that is underlined and end each line to DEBUG with pressing the ENTER key. Do not type the remarks at the end of each line (from the ';' to the end of line) as these are provided for your information and will cause errors with DEBUG.

Figure 4
Creating 123OPT.COM

```
 (22:25:Ø1) B:\pcm> debug 123opt.com
File not found;Disregard error message
-alØØ;Begin assembly at address ØlØØ
XXXX:ØlØØ mov ah,9;MS-DOS Function = display string
XXXX:ØlØ2 mov dx,117;Message address offset
XXXX:ØlØ5 int 21;MS-DOS function request
XXXX:ØlØ7 mov ah,8;MS-DOS function = get keystroke
XXXX:ØlØ9 int 21;MS-DOS function request
XXXX:ØlØB mov ah,4c;Set MS-DOS function for exit
XXXX:ØlØD sub al,3Ø;Remove ASCII character bias
XXXX:ØlØF jle lØ7;Character is less than "1"
XXXX:Ø111 cmp al,3;Check for upper bound
XXXX:Ø113 jg lØ7;Greater - loop until char valid
XXXX:Ø115 int 21;MS-DOS return - code in AL reg
XXXX:Ø117 db 'Enter option: $';Message to display
XXXX:Ø126:Extra line to end DEBUG assembly
-rcx;Set byte count in the CX reg
CX ØØØØ; .. for writing the COM file
:26; .. to disk
-w;Issue write command
Writing ØØ26 bytes
-q;Exit DEBUG and return to MS-DOS

 (22:27:Ø1) B:\pcm>
```

Notes:

1. **Make sure that you type only the text that is underlined and end each line to DEBUG by pressing the ENTER key. Do not type the remarks at the end of each line (from the ';' to the end of line) as these are provided for your information and will cause errors with DEBUG.**
2. **By changing the number in the instruction cmp al,3 at offset address 0111, you can make this respond to any number of options.** PCM

This spreadsheet template helps make tax time a little easier

Form 1040 in a Spreadsheet

By Richard A. White
PCM Contributing Editor

Tax time is upon us and they have not made things any simpler yet. If you and your spouse work, own a house, have medical and dental bills and other deductions, you are typical of many personal computer owners. If, like me, you have always done your own taxes, you might dread the more mechanical things such as making work sheets and checking and rechecking addition.

I found a number of years ago that a spreadsheet helps a lot. So here is one I used last year and which I have redone to run in *Lotus 1-2-3*. It is a full 1040 implementation complete with Schedules A, B and W. With minor syntax changes, it should work in any spreadsheet program that supports @IF, @ROUND and some version of LOOKUP. Unfortunately, it is much too much for *DeskMate*. *DeskMate* lacks the @IF command and cannot accomodate a spreadsheet this large.

As long as you enter your data properly, the spreadsheet will do nearly all the work including transferring results from the schedules to the proper lines in Form 1040 and calculating your Tax Table or Schedule X, Y or Z tax.

I won't discuss tax code details. If you need more help than that which comes with the forms, buy a copy of one of the tax preparation books on the newsstands. I have found the *H & R Block Income Tax Workbook* handy as much for the examples it provides as anything else. By the way, the spreadsheet was verified using examples from the 1986 edition.

Since the spreadsheet is quite long, I must assume the reader is somewhat experienced with their spreadsheet and I will keep my comments to a minimum. So, let's start with the beginning of the 1040 form. This form and the schedules are essentially three-column affairs. The text is in Column A, while most of the numbers go into Column C. In some instances, entries are made in Column B and their results carried into Column C. See Figure 1.

I set Column A at 27 characters since I planned to condense the text. Columns B and C are the nine-column default. Since I am using a formula dump feature, I will widen these columns as needed to accommodate full formula lengths. Under "Filing Status," enter .1 in the B8. . .B12 cell that corresponds to your status when you enter your tax data. You must fill in only one of these for the program to work properly.

The exemptions section, shown in Figure 2, is a bit expanded over that in the 1040. It works much the same. Use Column A for text entries like dependent names and enter 1s as appropriate in Column B. The spreadsheet totals up the values for the right-hand blocks on the 1040 as well as using the total exemptions calculated automatically elsewhere in the spreadsheet. You do not need to manually transfer this value.

I have provided small work sheets within the income section, (Figure 3) where you can enter wages from different sources and have the program automatically total them. If you use Schedule B, the interest and dividend

---

Richard White has a long background with microcomputers and specializes in BASIC programming. He has authored numerous programs and articles. His work has also appeared in PCM's sister publication, THE RAINBOW.

Figure 1:

```
   [            A              ][   B   ][   C   ]
 1- 1Ø4Ø U.S. INCOME TAX RETURN   1985
 2-
 3-Name (& Spouse's name)
 4-
 5-
 6-------------------------------------------------
 7-Filing Status (Enter #1)      * * * *  * * * *
 8-    1 Single                           * * * *
 9-    2 Married- Joint Return            * * * *
1Ø-    3 Married- Sep. Returns            * * * *
11-    4 Head of household                * * * *
12-    5 Qualifying widow(er)             * * * *
13-------------------------------------------------
```

Figure 2:

```
   [            A              ][   B   ][      C       ]
14-Exemptions (Enter #1 for each claimed * * * * * * * *
15-    6a  Yourself                      * * * * * * * *
16-        65 or older                   * * * * * * * *
17-        Blind                         @SUM(B15...B17)
18-    6b  Spouse                        * * * * * * * *
19-        65 or older                   * * * * * * * *
2Ø-        Blind                         @SUM(B18...B2Ø)
21-    6c  Dependent children & names    * * * * * * * *
22-                                      * * * * * * * *
23-                                      * * * * * * * *
24-                                      * * * * * * * *
25-                                      * * * * * * * *
26-                                      * * * * * * * *
27-                                      @SUM(B21...B27)
28-    6d  Dep. children living away     * * * * * * * *
29-                                      * * * * * * * *
3Ø-                                      B29+B3Ø
31-    6e  Other Dependents              * * * * * * * *
32-                                      * * * * * * * *
33-                                      * * * * * * * *
34-                                      @SUM(B31...B34)
35-    6f Total exemptions claimed       @SUM(C17...C34)
36-------------------------------------------------------
```

amounts are automatically transferred. If not, there is some space provided to list a few payers of each, as well as other income. Remember that text goes in Column A and amounts go in Column B. Column C results are calculated. Note the @IF( ) in C65 that checks that your dividend exclusion does not exceed your dividends. If it does, the formula enters a zero and not a negative number.

I should point out that the G152 in Cell B108 (Figure 4) is a formula that transfers the final result of the Schedule W calculation. You will see other single-cell references like this. Just remember to precede them with a plus sign (+) when you type them so the spreadsheet knows that they are formulas.

In the tax computation section (Figure 5), your results from Schedule A, if you use it, are automatically transferred. If not, there are some contributions you may still enter in B118 and B119. Your number of exemptions is used to automatically calculate the total exemption in C123.

Your tax is reported in B125. If you use a spreadsheet other than *Lotus 1-2-3* which does *not* automatically resolve all references, you will need to make at least three recalculations to assure that your tax is properly computed. It is best to manually recalculate until B125 stops changing. If you do income averaging, you will need to manually enter that tax in B126. The spreadsheet will use the lower of B125 and B126.

The credits section (Figure 6) is straightforward. The @IF( )'s in C140 and C145 are to assure that a negative tax does not result.

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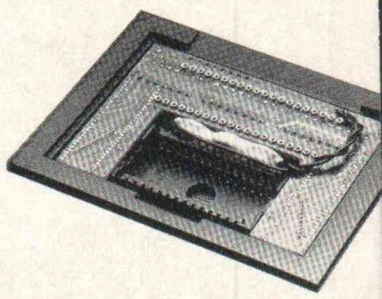

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Not only does this firmware let you copy a file from bank to bank, but you can make a copy of any file within the same bank instantly with a function key. Great for Lucid spreadsheets!

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You can also rename a file, or kill any file with just a function key. Plus you can do a whole lot of other useful things like setting the date, day and time with function key ease. You even have a function key that lets you use non-Radio Shack printers without having to make those tricky dipswitch settings.

RAM+ lets you cold start any one of your banks without affecting the other three. That means that anytime you want you can clean out a bank's entire memory, but leave intact all the files in the other banks.

What is also fantastic is that you don't have to have the ROM in place to use the additional RAM. Whenever you take out the snap-in ROM it leaves behind a tiny machine code program that lets you switch from bank to bank just by pressing ENTER.

This lets you use your ROM socket to snap-in other ROMS like LUCID spreadsheet, WRITE ROM text processor, or DISK+ ROM file transfer program, and use them in any or all four banks. All of these, by the way, are available from PCSG.

When you are ready to copy a file from one bank to another or use any of the other fantastic functions we talked about you can just snap the RAM+ ROM back into place.

Everybody that has this 128K system in their Model 100 is so excited, because it gives them four times the capacity and all banks work just like the Main Menu.

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Figure 3:

```
     [          A          ][      B      ][          C          ]
37-Income
38-   List wages, salaries & tips                 * * * * * * * * * * *
39-                                               * * * * * * * * * * *
4Ø-                                               * * * * * * * * * * *
41-                                               * * * * * * * * * * *
42-                                               * * * * * * * * * * *
43-                                               * * * * * * * * * * *
44-                                               * * * * * * * * * * *
45-                                               * * * * * * * * * * *
46-
47-   7  Wages, salaries & tips * * * * * * * * @SUM(B38...B47)
48-                             * * * * * * * * * * * * * * * * * * *
49-   List interest income      * * * * * * * * * * * * * * * * * * *
5Ø-     Schedule B if used      G1Ø7              * * * * * * * * * * *
51-                                               * * * * * * * * * * *
52-                                               * * * * * * * * * * *
53-                                               * * * * * * * * * * *
54-                                               * * * * * * * * * * *
55-   8 Interest income         * * * * * * * * @SUM(B49...B55)
56-                             * * * * * * * * * * * * * * * * * * *
57-   List dividend income      * * * * * * * * * * * * * * * * * * *
58-     Schedule B if used      G132              * * * * * * * * * * *
59-                                               * * * * * * * * * * *
6Ø-                                               * * * * * * * * * * *
61-                                               * * * * * * * * * * *
62-                                               * * * * * * * * * * *
63-   9a Dividends              @SUM(B57...B62) * * * * * * * * * * *
64-   9b Exclusion                              * * * * * * * * * * *
65-   9c Dividends less exclusion               @IF(B63>B64,B63-B64,Ø)
66-                             * * * * * * * * * * * * * * * * * * *
67-   1Ø Taxable state/local tax refunds
68-   11 Alimony received       * * * * * * * *
69-   12 Business income (loss) Sch. C
7Ø-   13 Capital gain (loss)    Sch. D
71-                             * * * * * * * * * * * * * * * * * * *
72-   List capital gains distributions          * * * * * * * * * * *
73-      not shown on Line 13 above.            * * * * * * * * * * *
74-                                               * * * * * * * * * * *
75-                                               * * * * * * * * * * *
76-                                               * * * * * * * * * * *
77-   14 4Ø% of above capital gains dist        .4*@SUM(B73...B77)
78-   15 Supplimental gains (loss) F4797
79-   16 Taxable pensions, IRA, etc.
8Ø-   17a Other pensions etc.                    * * * * * * * * * * *
81-   17b Taxable amount        * * * * * * * *
82-   18 Rent, royalities etc.  Sch. E
83-   19 Farm income (loss)     Sch. F
84-   2Øa Unemployment comp.                     * * * * * * * * * * *
85-   2Øb Taxable amount        * * * * * * * *
86-   21a Social Security                        * * * * * * * * * * *
87-   21b Taxable amount        * * * * * * * *
88-      Tax exempt interest                     * * * * * * * * * * *
89-                             * * * * * * * * * * * * * * * * * * *
```

```
90-        List other income      * * * * * * * * * * * * * * * * * * * *
91-                                                * * * * * * * * * * * *
92-                                                * * * * * * * * * * * *
93-                                                * * * * * * * * * * * *
94-                                                * * * * * * * * * * * *
95-    22 Other income total      * * * * * * * * @SUM(B90...B95)
96-                               * * * * * * * * @SUM(C47...C95)
97-----------------------------------------------------------------------
```

Figure 4:

```
     [            A              ][   B   ][       C       ]
 98-Adjustments to Income         * * * *  * * * * * * * *
 99-    24 Moving expenses                 * * * * * * * *
100-    25 Employee Business exp.          * * * * * * * *
101-    26 IRA deduction                   * * * * * * * *
102-    27 Keogh deduction                 * * * * * * * *
103-    28 Penalty early withdraw          * * * * * * * *
104-    29 Alimony paid                    * * * * * * * *
105-       Recipient name/S.S #            * * * * * * * *
106-                              * * * *  * * * * * * * *
107-                              * * * *  * * * * * * * *
108-    30 Married deduct. Sch W  G152     * * * * * * * *
109-    31 Total adjustments      * * * *  @SUM(B98...B109)
110-----------------------------------------------------------
111-Adjusted Gross Income        * * * *  * * * * * * * *
112-    32 Adjusted gross income  * * * *  C96-C109
113-----------------------------------------------------------
```


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Figure 5:

```
     [            A              ][   B    ][       C        ]
114-Tax Computation               * * * * * * * * * * * * * *
115-   33 Adjusted gross income  * * * * * C112
116-   34a Itemized deduction Sch. A       G85
117-   If you do not itemize-    * * * * * * * * * * * * * *
118-   34b Cash contributions              * * * * * * * * *
119-   34c Non-cash contribtions           * * * * * * * * *
12Ø-   34d Total 34b and 34c     B118+B119 * * * * * * * * *
121-   34e Line 34d/2            * * * * * B12Ø/2
122-   35 Income less deductions * * * * * C112-C116-C121
123-   36 Total exemption        * * * * * C35*1Ø4Ø
124-   37 Taxable income         * * * * * C122-C123
125-      Table/Schedule XYZ tax C194      * * * * * * * * *
126-      Schedule G tax                   * * * * * * * * *
127-   38 Table/Schedule tax     * * * * * @MIN(B125...B126)
128-   39 Additional taxex       * * * * *
129-      Enter form number                * * * * * * * * *
13Ø-   4Ø Total precredit tax    * * * * * C127+C128
131-----------------------------------------------------------
```

Figure 6:

```
     [            A              ][   B    ][            C          ]
132-Credits                       * * * *  * * * * * * * * * * * * *
133-   41 Dependent care F2441            * * * * * * * * * * * * *
134-   42 Elderly/disabled care           * * * * * * * * * * * * *
135-      Schedule R              * * * *  * * * * * * * * * * * * *
136-   43 Residential Energy              * * * * * * * * * * * * *
137-      Form 5695               * * * *  * * * * * * * * * * * * *
138-   44 Politial Contrib.               * * * * * * * * * * * * *
139-   45 Personal credits       * * * *  @SUM(B133...B138)
14Ø-   46 Tax less pers. credits * * * *  @IF(C139<C13Ø,C13Ø-C139,Ø)
141-   47 Foreign tax  Form 1116          * * * * * * * * * * * * *
142-   48 Gen business credit             * * * * * * * * * * * * *
143-      List form number                * * * * * * * * * * * * *
144-   49 Total business/other   * * * *  C141+C142
145-   5Ø Tax less all credits   * * * *  @IF(C14Ø>C144,C14Ø-C144,Ø)
146-----------------------------------------------------------------
```

Figure 7:

```
     [            A              ][   B    ][       C        ]
147-Other Taxes                   * * * *  * * * * * * * * *
148-   51 Self-employment tax   Sch. SE
149-   52 Alt. minimum tax      Form 6251
15Ø-   53 Tax fm recap inv cr   Form 4255
151-   54 SS tax on tips        Form 4137
152-   55 Tax on an IRA         Form 5329
153-   56 Total tax              * * * *  @SUM(C145...C152)
154-----------------------------------------------------------
155-Payments                      * * * *  * * * * * * * * *
156-   57 Income tax withheld             * * * * * * * * *
157-   58 Estimated tax paid              * * * * * * * * *
158-   59 Earned tax credit               * * * * * * * * *
159-   6Ø Amt paid Form 4868              * * * * * * * * *
16Ø-   61 Excess SS/RRTA tax              * * * * * * * * *
161-   62 Fuels tax credit                * * * * * * * * *
162-      Form 4136                       * * * * * * * * *
163-   63 Reg Inv Co credit               * * * * * * * * *
```

```
164-      Form 2439                          * * * * * * * * *
165-   64 Total payments          * * * *  @SUM(B156...B164)
166-----------------------------------------------------------
167-Refund or Amount You Owe     * * * * *  * * * * * * * * * * * * * *
168-   65 Amount OVERPAID         * * * * *  @IF(C165>C153,C165-C153,C1)
169-   66 Amount to be REFUNDED TO YOU
17Ø-   67 Apply to 1986 Tax      C168-C169  * * * * * * * * * * * * * *
171-   68 AMOUNT YOU OWE         * * * * *  @IF(C153>C165,C153-C165,C1)
172-----------------------------------------------------------------------
```

The @IF( )'s in C168 and C171 (Figure 7) are setup to return either an entry in the "overpaid" category or in the "amount owed" category. If you overpaid, enter the refund desired in C169 and the amount to credit to 1986 taxes will be automatically calculated and shown in B170. This is backwards from the way we have entered data only into Column B and not Column C. But, the 1040 does it this way, so it should make filling the form out easier.

This completes Form 1040. We will start Schedule A at Cell E1. I like to make Column D a buffer and set it at 30 characters wide to assure that Schedule A is completely off the screen when working on the 1040 form. Make Column E27 to E30 characters and leave Columns F and G at nine-characters wide. See Figure 8.

Note that only medical expenses in excess of 5 percent of your adjusted income, C115, are deductable. So Form 1040 must be completed to that point for Schedule A to work correctly. This is only important in the final calculation and not while you are filling in data. But, I don't want you to get your hopes up if you enter your medical expenses before all your income is in and you think you will get a larger deduction than finally works out.

The amount listed in rows 56-60 (Figure 9) are not totalled. They are for information purposes only and should contain only contributions greater than $3,000. You will probably have numerous smaller contributions. Make a separate worksheet to record and total these. In fact, you may need a number of separate worksheets. The *H & R Block Workbook* has good examples of small worksheets that can be easily converted to spreadsheet templates.

See Figure 10. The tax tables and schedules have a standard deduction already built in. Your itemized deduction amount is what exceeds the standard deduction. When you entered a 1 in one of the B8. . .B12 cells, you told the template what your filing status was. The 1 was then multiplied by the appropriate standard deduction value in one of the H8. . .H12 cells. Since only one of the B8. . .B12 cells contains a number, only one of the H8. . .H12 cells will be evaluated. The formula @MAX(H8. . .H12) gets that number into G84. The @IF( ) in G85 compares itemized deductions with the standard deduction and returns the difference or zero.

Figure 8:

```
   [            E              ][      F      ][          G          ][   H    ]
 1-  Schedule A  -- Itemized Deductions        1985
 2-
 3-----------------------------------------------------------------------
 4-Medical and Dental Expenses  * * * * * * *  * * * * * * * * * * *
 5-   1 Medicines and drugs                    * * * * * * * * * * *
 6-   2a Doctors, dentists etc                 * * * * * * * * * * *
 7-   2b Transportation/lodging                * * * * * * * * * * *
 8-      List other             * * * * * * *  * * * * * * * * * * *  239Ø*B8
 9-                                            * * * * * * * * * * *  354Ø*B9
1Ø-                                            * * * * * * * * * * *  177Ø*B1Ø
11-                                            * * * * * * * * * * *  239Ø*B11
12-                                            * * * * * * * * * * *  354Ø*B12
13-                                            * * * * * * * * * * *
14-                                            * * * * * * * * * * *
15-                                            * * * * * * * * * * *
16-   2c Other total            @SUM(F9...F15) * * * * * * * * * * *
17-   3 Total Lines 1-2c        F5+F6+F7+F16   * * * * * * * * * * *
18-   4 5% of line 33 Form 1Ø4Ø .Ø5*C115       * * * * * * * * * * *
19-   5 Total medical & dental  * * * * * * *  @IF(F17>F18,F17-F18,Ø)
2Ø-----------------------------------------------------------------------
```

Figure 9:

```
   [            E              ][      F      ][          G          ]
21-Taxes You Paid               * * * * * * * *  * * * * * * * * * *
22-   6 State & local income tx                 * * * * * * * * * *
```

```
23-    7 Real estate taxes                          * * * * * * * * * * *
24-    8a General sales taxes                       * * * * * * * * * * *
25-    8b Sales tax on motor veh                    * * * * * * * * * * *
26-       List other taxes          * * * * * * * *  * * * * * * * * * * *
27-                                                  * * * * * * * * * * *
28-                                                  * * * * * * * * * * *
29-                                                  * * * * * * * * * * *
30-                                                  * * * * * * * * * * *
31-                                                  * * * * * * * * * * *
32-    9 Other taxes               @SUM(F27...F31)  * * * * * * * * * * *
33-    10 Total taxes              * * * * * * * * *  @SUM(F22...F25)+F32
34-------------------------------------------------------------------------
35-Interest You Paid               * * * * * * * * *  * * * * * * * * * * *
36-    11a Mortgage int to inst                      * * * * * * * * * * *
37-    11b Mortgage int to indiv                     * * * * * * * * * * *
38-       List person paid int    * * * * * * * * *  * * * * * * * * * * *
39-                                                  * * * * * * * * * * *
40-                                                  * * * * * * * * * * *
41-    12 Cr card/cg acct int                        * * * * * * * * * * *
42-       List other interest     * * * * * * * * *  * * * * * * * * * * *
43-                                                  * * * * * * * * * * *
44-                                                  * * * * * * * * * * *
45-                                                  * * * * * * * * * * *
46-                                                  * * * * * * * * * * *
47-                                                  * * * * * * * * * * *
48-                                                  * * * * * * * * * * *
49-    13 other interest           @SUM(F43...F48)  * * * * * * * * * * *
```


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```
50-   14 Total interest          * * * * * * * *  F36+F37+F41+F49
51-----------------------------------------------------------------
52-Contributions You Made        * * * *  * * * * * * *
53-   15a Cash cont <$3000                * * * * * * *
54-   15b Cash cont >$3000                * * * * * * *
55-       List whom/how much              * * * * * * *
56-                                       * * * * * * *
57-                                       * * * * * * *
58-                                       * * * * * * *
59-                                       * * * * * * *
60-                                       * * * * * * *
61-   16 other than cash                  * * * * * * *
62-   17 Carryover                        * * * * * * *
63-   18 Total contributions     * * * *  F53+F54+F61+F6
64-----------------------------------------------------
```

Figure 10:

```
    [            E              ][       F       ][          G          ]
65-   19 Total casuslty/theft    * * * * * * * *
66-       Attach Form 4684       * * * * * * * *  * * * * * * * * * * * *
67-----------------------------------------------------------------------
68-Miscellaneous Deductions      * * * * * * * *  * * * * * * * * * * * *
69-   20 Union & Prof dues                       * * * * * * * * * * * *
70-   21 Tax return prep fee                     * * * * * * * * * * * *
71-       List other             * * * * * * * *  * * * * * * * * * * * *
72-                                               * * * * * * * * * * * *
73-                                               * * * * * * * * * * * *
74-                                               * * * * * * * * * * * *
75-                                               * * * * * * * * * * * *
76-                                               * * * * * * * * * * * *
77-                                               * * * * * * * * * * * *
78-                                               * * * * * * * * * * * *
79-   22 Other deductions        @SUM(F72...F78)  * * * * * * * * * * * *
80-   23 Total Miscellaneous     * * * * * * * *  F69+F70+F79
81-----------------------------------------------------------------------
82-Summary of Itemized Deductions                * * * * * * * * * * * *
83-   24 Total Lns 5,10,14,18,19,23              G19+G33+G50+G63+G65+G80
84-   25 Standard deduction                      @MAX(H8...H12)
85-   26 Itemized deductions                     @IF(G83>G84,G83-G84,0)
86-----------------------------------------------------------------------
```

Figure 11:

```
    [            E              ][   F   ][       G       ]
87-
88-Schedule B -- Interest & Dividend Income
89-----------------------------------------------------
90-Part 1  Interest Income       * * * *  * * * * * * * *
91-   1 Interest from mortgages  * * * *
92-       List payer             * * * *
93-                              * * * *
94-   2 List other interest      * * * *
95-                              * * * *
96-                              * * * *
97-                              * * * *
98-                              * * * *
99-                              * * * *
```

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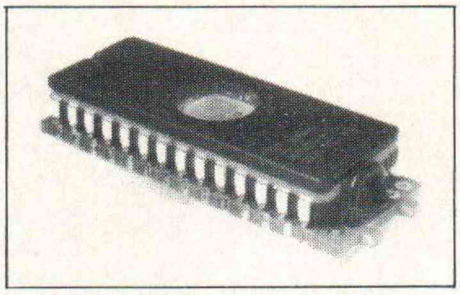

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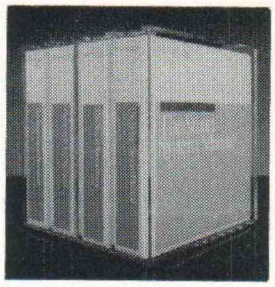

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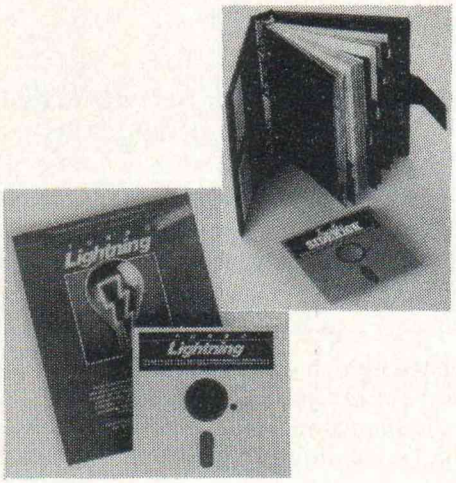

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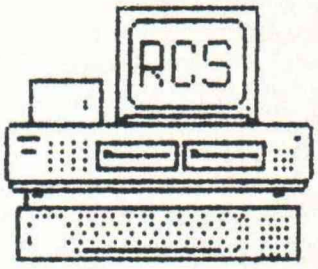

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```
100-                                  * * * *
101-                                  * * * *
102-                                  * * * *
103-                                  * * * *
104-                                  * * * *
105-                                  * * * *
106-                                  * * * *
107-   3 Total Interest               * * * *  @SUM(G91...G106)
108-----------------------------------------------------------

    [            E                 ][   F   ][       G        ]
109-Part II  Dividend Income         * * * *  * * * * * * * * *
110-   4 List dividend income        * * * *
111-                                  * * * *
112-                                  * * * *
113-                                  * * * *
114-                                  * * * *
115-                                  * * * *
116-                                  * * * *
117-                                  * * * *
118-                                  * * * *
119-                                  * * * *
120-                                  * * * *
121-                                  * * * *
122-                                  * * * *
123-                                  * * * *
124-                                  * * * *
125-                                  * * * *
126-                                  * * * *
127-   5 Total listed dividends       * * * *  @SUM(G110...G126)
128-   6 Capital gains dist.                   * * * * * * * * *
129-   7 Nontaxable distribution               * * * * * * * * *
130-   8 Public util. exclusion                * * * * * * * * *
131-   9 Total exclusions             * * * *  @SUM(F128...F130)
132-   10 Net dividends               * * * *  G127-G131
133-----------------------------------------------------------
```

There is nothing fancy about Schedule B (Figure 11) except I blocked out Column F forcing values to be entered into Column G to comform to the IRS form.

Of course, inclusion of Schedules A, B and W (Figure 12) are optional. If you and your family or friends don't need them, don't bother typing them in. Figure 13 shows the tax lookup tables which should be placed in the exact cells shown so that the tax calculation formulas will work.

The tax schedule values came from the 1986 *H & R Block Workbook*. I have to assume that they are correct at this writing. You might check the values for the schedule and range you will be using against the schedule in the IRS booklet you got with your 1040.

Now we come to the hard work, typing in the tax calculation formulas exactly as they appear in Figure 14. By the way, if you know that you will only be filing a married joint return, for example, you can cut your work by only typing the lookup table and the calculation formulas that apply. Be sure to type these exactly where shown in the spreadsheet and you should have no trouble.

The IRS expects those whose taxable income is less than $50,000 to look up their tax in the tax tables. Since the IRS computers check to make sure this is done accurately, our spreadsheet must calculate the same value as the tax table provides. For income over $3,000, the tables are set up in $50 ranges and the tax is that on the central value in the range. For example, the tax table value for $11,035 is actually the tax on 11025. The formulas in cells `A173...A177` determine the taxable income for tax table lookup.

For income below $3,000, the tables are set up in $25 increments so we need different formulas in cells `B173...B177` to calculate a correct income in this range. The formula in cell `B175` is incomplete above and should be:

```
@IF(B174<25,12.5,@IF(B174<50,
37.5,@IF(B174<75,62.5,87.5))))
```

The `@IF( )` in `C177` chooses which taxable income value to use. If taxable income is over $50,000, the taxable income from `C124` is used directly. Three `@VLOOKUP( )` formulas get the right values from the lookup tables. The calculations are done within the `@ROUND( )` formulas which return an integer tax value.

You should be able to type in the template and debug it in a few evenings. And once you have it working, try your hand at the 1040A and some others you might need to use. □

Figure 12:

```
    [            E              ][      F      ][       G        ]
134-Schedule W
135-Deduction for a Married Couple When Both Work
136-------------------------------------------------------------
137-Step 1 Your earned income    (a) You       (b) Spouse
138-------------------------------------------------------------
139-   1 Wages etc F1Ø4Ø Ln 7
14Ø-   2 Other earned income
141-   3 Total earned income     F139+F14Ø      G139+G14Ø
142-                             * * * * * * *  * * * * * * * * *
143-Step 2 Qualified earned income             * * * * * * * * *
144-------------------------------------------------------------
145-   4 Lns 25,26,27,31 adjust
146-   5 Qualified earned income F141-F145      G141-G145
147-                             * * * * * * *  * * * * * * * * *
148-Step 3  Figure Your Deduction
149-------------------------------------------------------------
15Ø-   6 Smaller of 5a or 5b     * * * * * * *  @MIN(F146...G146)
151-   7 Percentage to figure deduction                      1Ø
152-   8 Deduction                             .1*G15Ø
153-------------------------------------------------------------
```

Figure 13:

```
    [            E              ][   F   ][   G   ][   H    ]
154-Income Tax lookup tables        Schedule X
155-Schedule X  Taxable Income      Rate   Precalc  Amt over
156-                        Ø.ØØ     Ø.ØØ     Ø.ØØ      Ø.ØØ
157-                     239Ø.ØØ     Ø.11     Ø.ØØ   239Ø.ØØ
158-                     354Ø.ØØ     Ø.12   126.5Ø   354Ø.ØØ
159-                     458Ø.ØØ     Ø.14   251.3Ø   458Ø.ØØ
16Ø-                     676Ø.ØØ     Ø.15   556.5Ø   676Ø.ØØ
161-                     885Ø.ØØ     Ø.16   87Ø.ØØ   885Ø.ØØ
162-                    1124Ø.ØØ     Ø.18  1252.4Ø  1124Ø.ØØ
163-                    1343Ø.ØØ     Ø.2Ø  1646.6Ø  1343Ø.ØØ
164-                    1561Ø.ØØ     Ø.23  2Ø82.6Ø  1561Ø.ØØ
165-                    1894Ø.ØØ     Ø.26  2848.5Ø  1894Ø.ØØ
166-                    2446Ø.ØØ     Ø.3Ø  4283.7Ø  2446Ø.ØØ
167-                    2997Ø.ØØ     Ø.34  5936.7Ø  2997Ø.ØØ
168-                    3549Ø.ØØ     Ø.38  7813.5Ø  3549Ø.ØØ
169-                    4319Ø.ØØ     Ø.42 1Ø739.5Ø  4319Ø.ØØ
17Ø-                    5755Ø.ØØ     Ø.48 1677Ø.7Ø  5755Ø.ØØ
171-                    8513Ø.ØØ     Ø.5Ø 3ØØØ9.1Ø  8513Ø.ØØ
172-                 99999999.ØØ
173-------------------------------------------------
174-                                Schedule Z
175-Schedule Z Taxable Income       Rate   Precalc  Amt over
176-                        Ø.ØØ     Ø.ØØ     Ø.ØØ      Ø.ØØ
177-                     239Ø.ØØ     Ø.11     Ø.ØØ   239Ø.ØØ
178-                     458Ø.ØØ     Ø.12   24Ø.9Ø   458Ø.ØØ
179-                     676Ø.ØØ     Ø.14   5Ø2.5Ø   676Ø.ØØ
18Ø-                     9Ø5Ø.ØØ     Ø.17   823.1Ø   9Ø5Ø.ØØ
181-                    1228Ø.ØØ     Ø.18  1372.2Ø  1228Ø.ØØ
182-                    1561Ø.ØØ     Ø.2Ø  1971.6Ø  1561Ø.ØØ
183-                    1894Ø.ØØ     Ø.24  2637.6Ø  1894Ø.ØØ
184-                    2446Ø.ØØ     Ø.28  3962.4Ø  2446Ø.ØØ
185-                    2997Ø.ØØ     Ø.32  55Ø5.2Ø  2997Ø.ØØ
186-                    3549Ø.ØØ     Ø.35  7271.6Ø  3549Ø.ØØ
187-                    4652Ø.ØØ     Ø.42 11132.1Ø  4652Ø.ØØ
188-                    63Ø7Ø.ØØ     Ø.45 18Ø83.1Ø  63Ø7Ø.ØØ
```

```
189-                    8513Ø.ØØ     Ø.48 28Ø1Ø.1Ø  8513Ø.ØØ
19Ø-                   11272Ø.ØØ     Ø.5Ø 41253.3Ø 11272Ø.ØØ
191-                 99999999.ØØ
192-----------------------------------------------
193-Married Joint Returns            Schedule Y
194-Schedule Y Taxable Income       Rate   Precalc  Amt over
195-                        Ø.ØØ     Ø.ØØ     Ø.ØØ      Ø.ØØ
196-                     354Ø.ØØ     Ø.11     Ø.ØØ   354Ø.ØØ
197-                     572Ø.ØØ     Ø.12   239.8Ø   572Ø.ØØ
198-                     791Ø.ØØ     Ø.14   5Ø2.6Ø   791Ø.ØØ
199-                    1239Ø.ØØ     Ø.16  1129.8Ø  1239Ø.ØØ
2ØØ-                    1665Ø.ØØ     Ø.18  1811.4Ø  1665Ø.ØØ
2Ø1-                    21Ø2Ø.ØØ     Ø.22  2598.ØØ  21Ø2Ø.ØØ
2Ø2-                    256ØØ.ØØ     Ø.25  36Ø5.6Ø  256ØØ.ØØ
2Ø3-                    3112Ø.ØØ     Ø.28  4985.6Ø  3112Ø.ØØ
2Ø4-                    3663Ø.ØØ     Ø.33  6528.4Ø  3663Ø.ØØ
2Ø5-                    4767Ø.ØØ     Ø.38 1Ø171.6Ø  4767Ø.ØØ
2Ø6-                    6245Ø.ØØ     Ø.42 15788.ØØ  6245Ø.ØØ
2Ø7-                    89Ø9Ø.ØØ     Ø.45 26976.8Ø  89Ø9Ø.ØØ
2Ø8-                   11386Ø.ØØ     Ø.49 38123.3Ø 11386Ø.ØØ
2Ø9-                   169Ø2Ø.ØØ     Ø.5Ø 65151.7Ø 169Ø2Ø.ØØ
21Ø-                 99999999.ØØ
211-----------------------------------------------
212-Married Separate Returns
213-Schedule Y Taxable Income       Rate   Precalc  Amt over
214-                        Ø.ØØ     Ø.ØØ     Ø.ØØ      Ø.ØØ
215-                     177Ø.ØØ     Ø.11     Ø.ØØ   177Ø.ØØ
216-                     286Ø.ØØ     Ø.12   119.9Ø   286Ø.ØØ
217-                     3955.ØØ     Ø.14   251.3Ø   3955.ØØ
218-                     6195.ØØ     Ø.16   564.9Ø   6195.ØØ
219-                     8325.ØØ     Ø.18   9Ø5.7Ø   8325.ØØ
22Ø-                    1Ø51Ø.ØØ     Ø.22  1299.ØØ  1Ø51Ø.ØØ
221-                    128ØØ.ØØ     Ø.25  18Ø2.8Ø  128ØØ.ØØ
222-                    1556Ø.ØØ     Ø.28  2492.8Ø  1556Ø.ØØ
223-                    18315.ØØ     Ø.33  3264.2Ø  18315.ØØ
224-                    23835.ØØ     Ø.38  5Ø85.8Ø  23835.ØØ
225-                    31225.ØØ     Ø.42  7894.ØØ  31225.ØØ
226-                    44545.ØØ     Ø.45 13488.4Ø  44545.ØØ
227-                    5693Ø.ØØ     Ø.49 19Ø61.65  5693Ø.ØØ
228-                    8451Ø.ØØ     Ø.5Ø 32575.85  8451Ø.ØØ
229-                 99999999.ØØ
```

Figure 14:

```
     [            A              ][              B              ][          C          ]
173- 1ØØ*@INT(C124/1ØØ)           1ØØ*@INT(C124/1ØØ)
174- C124-A173                    C124-B173
175- @IF(A174<5Ø,25,75            @IF(B174<25,12.5,@IF(B174<5Ø,37.
176- A173+A175                    B173+B175
177- @IF(C124<5ØØØØ,A176,C124     @IF(C124<5ØØØØ,B176,C124)        @IF(C124<3ØØØ,B177,A177)
178-Filing status 1   Precalc     @VLOOKUP(C177,E156...E172,2)
179-                Amount over   @VLOOKUP(C177,E156...E172,3)
18Ø-                       Rate   @VLOOKUP(C177,E156...E172,1)
181-                        Tax   @ROUND(B18Ø*(C177-B179)+B178,Ø)  @IF(B8>Ø,B181,Ø)
182-Filing status 4    Precalc    @VLOOKUP(C177,E176...E191,2)
183-                              @VLOOKUP(C177,E176...E191,3)
184-                              @VLOOKUP(C177,E176...E191,1)
185-                              @ROUND(B184*(C177-B183)+B182,Ø)  @IF(B11>Ø,B185,Ø)
186-Filing status 2&5    Precalc  @VLOOKUP(C177,E195...E21Ø,2)
187-Joint Returns    Amount over  @VLOOKUP(C177,E195...E21Ø,3)
188-                       Rate   @VLOOKUP(C177,E195...E21Ø,1)
189-                        Tax   @ROUND(B188*(C177-B187)+B186,Ø)  @IF((B9+B12)>Ø,B189,Ø)
19Ø-Filing status 3      Precalc  @VLOOKUP(C177,E214...E229,2)
191-Separate Returns Amount over  @VLOOKUP(C177,E214...E229,3)
192-                              @VLOOKUP(C177,E214...E229,1)
193-                              @ROUND(B192*(C177-B191)+B19Ø,Ø)  @IF(B1Ø>Ø,B193,Ø)
194-                                                               @SUM(C181...C193)
```

PCM

A Text Analyzer For The Model 100/200

By Ronald F. Balonis

The Model 100 is called a "portable computer." That's probably why you bought it. But its real worth, as most find, is in what it lets you do with your words rather than your numbers. Everyone must write. And, no matter what your writing proficiency or needs, writing on a 100 is the best way yet to make the most of what you do.

Writing Better with the Text Editor

It's a fact of life in computing: Computers make you write. To make them go, you must write programs for them. And now, you can also use them to write for people. They're both called writing, but that's where the similarity ends. Writing for a computer is easier; its words and syntax have only one meaning, and when it doesn't understand, it tells you so. When writing for people, you never really know; there's seldom any useful feedback. That's where a little word processing such as the 100's text editor helps. It helps you find and fix errors of spelling and syntax; to find and fix errors of meaning; to revise and edit until it says what you mean; to make your writing readable and understandable.

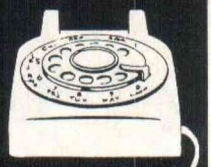
Everyone can acquire the skills of writing. You get the spelling and meaning from dictionaries, the grammar and syntax from text books, the skill in their use from practice, practice, and more practice. Somehow though, the computerist in me thinks there must be an easier way. There needs to be a program to compute the statistics of *readability* of your work.

Computing Readability

Readability schemes abound in the academic world. Three of the readability disciples whose work made my text analyzer, TSTATS.BA, program possible are Dr. Edward Fry, Robert Gunning and Dr. Rudolf Flesch. Their readability methods count the words and the syllables, find the average length of the sentences and the number of sentences and syllables per hundred words, then use them to compute a level of education for the text. However, the methods do not account for context, content, or style, so the implied precision is imprecise at best. They should be used as a guide, rather than a panacea, to better writing —

Ronald F. Balonis is chief engineer of radio station WILK in Wilkes-Barre, Pennsylvania. He has been an electronics and computer hobbyist for many years and, since March 1983, a Model 100 enthusiast.

The Accessible Computer Experts



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like a dictionary, a thesaurus or a book on grammar.

With Dr. Edward Fry's readability method, you count the number of sentences and syllables per hundred words. Then plot the numbers on his readability graph to find the grade (education) level of the text.

Robert Gunning computes his Fog Index, which relates to the education level of the text, by counting the number of sentences and polysyllables per hundred words. Add the two numbers together, and then multiply by 0.4 to get the Fog Index.

Dr. Rudolf Flesch's method computes a reading ease score; he also has a similar method to compute a human interest score by counting the number of personal references in the sentences. As in the other methods, you count the words and syllables per hundred words; then, to compute the reading ease score, multiply the number of sentences per hundred words by 1.015; multiply the number of syllables per hundred words by 0.846; add them together and subtract from 206.835 to get the reading ease score — a number between zero (unreadable) and 100 (very easy).

Readability has been a concern of many for many years. The object of writing or reading is clear communication, all too often not achieved. Over the years, there have been many researchers who have worked on readability. You can find out much more about readability and them at your local library. Find Dr. Fry's readability graph in the December 1977 issue of *The Journal of Reading*. Find Robert Gunning's Fog Index in his book *Techniques of Clear Writing*. And, find Dr. Flesch's readability score in his book *The Art of Readable Writing*.

The consensus of thought indicates that sentences and syllables per hundred words correlate to readability; only the method of defining what they mean varies. But these are not the only factors that can affect readability and understanding; there are many more, subjective ones, that are difficult to measure, even to define. Fortunately, these objective factors lend themselves to computerization: The task of counting sentences is easy; the grammar is rather exact. Counting of syllables, while not as exact because of the spelling and sound variability in our words, is also easy for a computer.

The Text Analyzer Program

TSTATS.BA counts the words and syllables, then displays these statistics of the text:

- Number of characters, words, sentences, punctuation marks and syllables
- Average lengths of words, sentences and punctuations
- Number per hundred of sentences, punctuation marks and syllables
- The number of and the distribution of words with one to five syllables
- The Fog Index and the reading ease score
- To find the readability according to Dr. Fry, plot the number of sentences and syllables per hundred words on his readability graph.

Resident text files and a built-in text editor make text analysis an easy task for the 100. The program has only to read the file, a character/word at a time and let it fall through the algorithm. The algorithm defines a syllable as

a group of characters including at least one vowel bounded by a space or consonant; a word as a group of characters bounded by a leading space and a trailing space or punctuation mark; and a sentence as a group of words followed by the punctuation mark and a space. The program loops on it and totals the characters, syllables, words and sentences in the the text file; then displays the text's statistics.

Program Description

TSTATS.BA consists of four sections: initializations, lines 0 to 85; directory sign on and file selection prompts in lines 100 to 190; syllable, word and sentence counting in lines 195 to 500; and statistics display in lines 1000 to 1520.

In the initializations section, the program dimensions the syllable distribution array SB(10) and the directory filename array DIR$(20). The section defines the strings of the program and constructs, in lines 40 through 50, a machine language program for an INKEY$ function with a cursor.

In the directory sign on section, lines 110 to 145 form the directory display routine. By using POKE commands, the RAM directory is defined in DIR$ and then the INSTR function searches it for all of the .DO files. Lines 160 to 185 form the file selection prompt routine which calls the INKEY$ program in ML$. Press the cursor keys and ENTER to select the text file to analyze.

In the syllable, word and sentence section, the function of the variables are: A$, the input character or the end character of a word; B$, a word; S, a syllable flag (it insures that two vowels in sequence count only as one syllable); WS, the count of syllables in a word; X, the length of a word; SY, the count of the total number of syllables; I, the INSTR value; SC, the count of sentences; and PC, the count of the punctuation marks.

In the statistics display section, Line 1400 calculates the Fog Index and lines 1410 and 1420 calculate the reading score.

To Use It

Just move the cursor to your text file and press ENTER. In a minute or two (35 seconds per 100 words) the file's statistics display. The statistics will vary depending on the type of writing, technical or prose; the style, formal or informal; the writer's education level, high or low; and, of course, imperfections of the counting algorithm.

It's best to gauge the meaning of text statistics by analyzing some text that you understand which was written by writers of acknowledged skill. Just remember, TSTATS.BA is only another writing tool, and like a dictionary, a thesaurus, or a grammar book, it won't improve your writing. You have to do that for yourself. *Practice.* □

See you at PCMfest—Chicago May 23-25

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Please see Review on Page 116.

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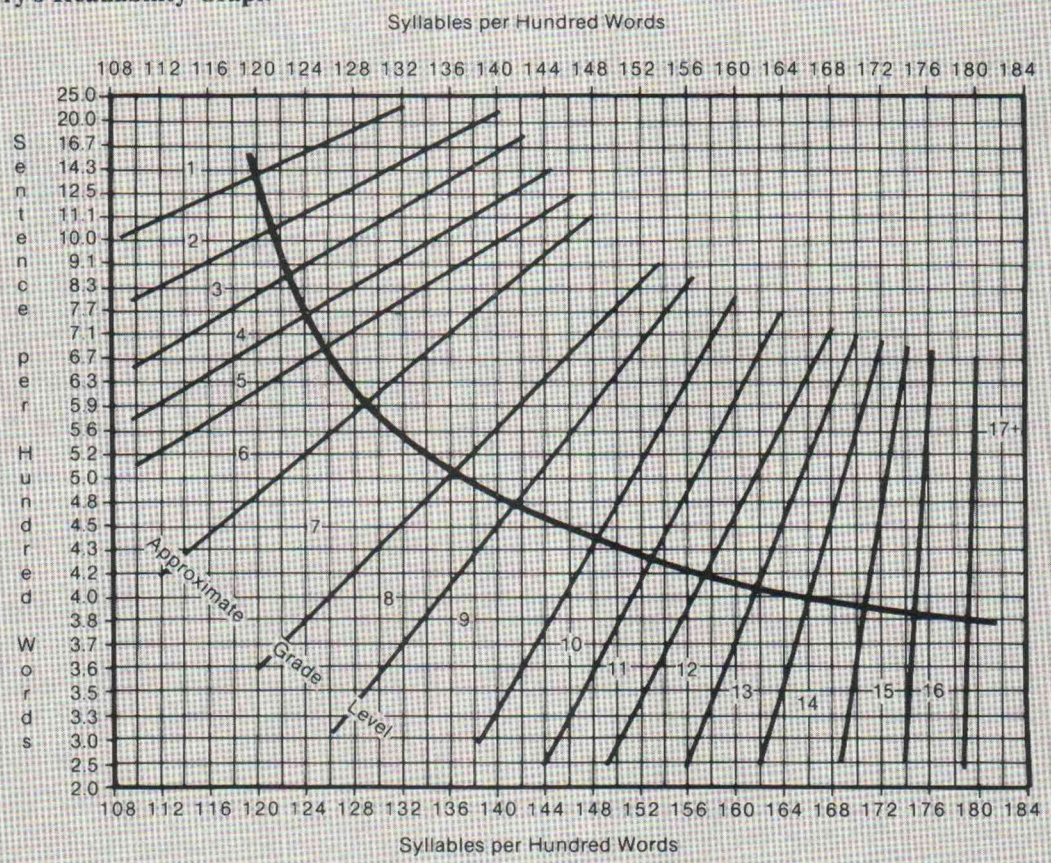
Figure 1
Dr. Edward Fry's Readability Graph



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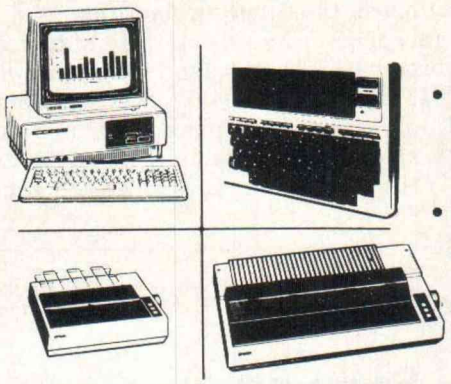

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PCM BAR CODED LISTING

The listing:

```
Ø ' TSTATS.BA  A TEXT ANALYZER
5 ' BY RONALD F. BALONIS APRIL 1, 1984
1Ø CLEAR 5ØØ:DEFINT A-Z:DIM SB(1Ø),DX$(2
Ø)
15 TLE$="===  TEXT ANALYSIS  ==="
2Ø CRLF$=CHR$(13)+CHR$(1Ø)
3Ø PUNCT$=CHR$(34)+",;:":DIR$="":DX$=""
4Ø ML$=CHR$(2Ø5)+CHR$(2Ø3)+CHR$(18)
5Ø ML$=ML$+CHR$(119)+CHR$(2Ø1)
6Ø F$="[ ]\    \ ":FX$=CHR$(192)
65 CMD$=" +++ PRESS <":'---CMD PROMPT
7Ø FOR I=152 TO 155
75  CMD$=CMD$+CHR$(I)
8Ø NEXT I
85 CMD$=CMD$+"> & <ENTER> +++":I=Ø:II=Ø
9Ø '
95 '---SIGN ON & DISPLAY .DO FILES
1ØØ CLS:PRINT@9,TLE$:PRINT:BEEP
11Ø X=VARPTR(DIR$):POKE X,24Ø
115 POKE X+1,174:POKE X+2,249
12Ø I=INSTR(I+1,DIR$,FX$):IF I=Ø THEN 14
5
125 DX$=MID$(DIR$,I+1,1Ø)
13Ø IF MID$(DX$,9,2)<>"DO" THEN 12Ø
135  II=II+1:DX$(II)=DX$
14Ø PRINTUSINGF$;MID$(DX$,3,6);:GOTO 12Ø
145 PRINT"[ ]MENU":I=1
15Ø PRINT@284,CMD$;:'---SELECT A FILE
155 IF I<1 OR I>II+1 THEN I=1
16Ø  PRINT@71+I*1Ø,"";:'---FILE CURSOR
165 KB!=PEEK(VARPTR(ML$)+2)*256
17Ø KB!=KB!+PEEK(VARPTR(ML$)+1)
175 KB=Ø:CALL KB!,Ø,VARPTR(KB):'ML INKEY
$
18Ø  IF KB=3Ø THEN I=I-4
181   IF KB=31 THEN I=I+4
182    IF KB=28 THEN I=I+1
183     IF KB=29 THEN I=I-1
184      IF KB<>13 THEN 155
185       IF I=II+1 THEN MENU
19Ø  F$=MID$(DX$(I),3,6)
195 CLS:PRINT@Ø,F$;:PRINT@9,TLE$
2ØØ OPEN F$ FOR INPUT AS 1:'ANALYZE FILE
2Ø5 IF EOF(1) THEN 27Ø ELSE A$=INPUT$(1,
1)
21Ø  IF INSTR(CRLF$,A$) THEN A$=" "
215   IF B$="" THEN IF A$=" " THEN 2Ø5
22Ø '---IS IT A SYLABLE?
225 ON INSTR("AEIOUYaeiouy",A$)+1 GOTO 2
45
23Ø '---COUNT IT
235 '---S=SYLABLE FLAG
24Ø IF S=Ø THEN WS=WS+1:S=1:GOTO 26Ø
245  S=Ø:'---CONSONANTS RESET FLAG
255 '---READ IN A COMPLETE WORD
26Ø  B$=B$+A$:IF A$<>" " THEN 2Ø5
27Ø  IF B$=""THEN 4ØØ
275 '---A WORD!
28Ø   X=LEN(B$)-1:A$=MID$(B$,X,1)
285 '
295 '---COUNT WORDS & LETTERS  B$=WORD
3ØØ   WRD=WRD+1:LTRS=LTRS+X:S=Ø
3Ø5 '---FOR WORDS ENDING IN E WS=WS-1
31Ø   IF INSTR("Ee",A$) THEN WS=WS-1
315   IF WS<1 THEN WS=1:'---AT LEAST 1
32Ø '---COUNT SYLABLES
325    SY=SY+WS:SB(WS)=SB(WS)+1:WS=Ø
33Ø '---END OF A SENTENCE?
335    IF INSTR(".?!",A$) THEN 39Ø:'YES
34Ø     I=INSTR(PUNCT$,A$):'---PUNCT?
345     ON I+1 GOTO 4ØØ,35Ø,395,395,395
35Ø  IF X>1 THEN A$=MID$(B$,X-1,1)
38Ø '---END OF A SENTENCE?
385   ON INSTR(".?!",A$)+1 GOTO 4ØØ
39Ø SC=SC+1:'---COUNT OF SENTENCES
395 PC=PC+1:'---COUNT OF PUNCTUATION
4ØØ PRINT@34,USING"#####";LTRS;
41Ø X=Ø:B$="":'---GET ANOTHER WORD
42Ø IF EOF(1) THEN 5ØØ ELSE 2Ø5
5ØØ CLOSE 1
6ØØ '
9ØØ '---DISPLAY STATISTICS
1ØØØ CLS:PRINTF$;:PRINT@8,TLE$:BEEP
1Ø1Ø PRINT"STATISTICS  AVG LGTH  ";
1Ø15 PRINT"#/1ØØ   SYLB DIST"
1Ø2Ø PRINTUSING"CHARS #####";LTRS
1Ø3Ø PRINTUSING"WORDS #####";WRDS
1Ø4Ø PRINTUSING"SENTS #####";SC
1Ø5Ø PRINTUSING"PUNCT #####";PC
1Ø6Ø PRINTUSING"SYLBS #####";SY
11ØØ X$="###.#"
111Ø PRINT@133,USINGX$;LTRS/WRDS;
112Ø PRINT@173,USINGX$;WRDS/SC;
113Ø PRINT@213,USINGX$;WRDS/PC;
115Ø PRINT@181,USINGX$;1ØØ*SC/WRDS;
116Ø PRINT@221,USINGX$;1ØØ*PC/WRDS;
117Ø PRINT@261,USINGX$;1ØØ*SY/WRDS;
12ØØ Y=68:'---SYLABLE DISTRIBUTION
121Ø FOR I=1 TO 5
122Ø  Y=Y+4Ø
123Ø  PRINT@Y,USING"#=####";I;SB(I);
124Ø  PRINTUSING" ##.#";1ØØ*SB(I)/WRDS
125Ø NEXT I
14ØØ FOG!=4Ø*(SB(3)+SC)/WRDS
141Ø RSC!=1ØØ*(SC*1.Ø15+SY*.846)/WRDS
142Ø RSC!=2Ø6.835-RSC!
143Ø F$="FOG=###.#  SCORE=###.#"
15ØØ PRINTUSINGF$;FOG!;RSC!;
151Ø PRINT" <PRESS SPACEBAR>";
152Ø IF INKEY$<>" " THEN 152Ø ELSE RUN
153Ø '---END OF PROGRAM                PCM
```

This utility program lets you print graphics on your DMP series printer

Graphics Screen Dump

By Peter T. Lee

The MS-DOS GRAPHICS.COM command is a utility program for reproducing the screen image onto a dot matrix printer. This allows you to make hardcopies of your graphics artwork, charts or other goodies.

The command is external to MS-DOS. This means it is a separate file on the disk and must be loaded into memory like any program. This makes it possible to replace this command without changing MS-DOS at all.

Tandy's version of this command supports only their CGP-220 Color Ink Jet printer at present. They have a much larger line of "DMP" printers capable of graphics, yet these are not supported. The reasoning behind this escapes me.

The program in this article fills the gap. It works exactly like GRAPHICS .COM and will work with Tandy's DMP series printers and a Tandy 1000, 1200, 3000 or any IBM PC compatible computer. Some printers will have to be set to the Tandy mode.

To enter the program, you'll need DEBUG.COM, another external command in MS-DOS version 2.0 or higher, or an assembler.

This program was developed completely using DEBUG which is why there are no comments (sorry about that). If you have any problems or questions, please write me and I'll try to answer as soon as possible.

Here is the dialogue for entering the listing using debug (user entries are in bold type):

```
A> debug
- a100
XXXX:0100 jmp 02fd
XXXX:0103 sti
XXXX:0104 jmp 02b7
```

(Continue to enter the rest of the listing.)

```
XXXX:0325 mov dx,02fd
XXXX:0328 int 27
XXXX:032A ENTER
- rbx
BX NNNN
: 0
- rcx
CX NNNN
: 32a
- nscntest.com
- w
writing 032A bytes
- q
A>
```

This will create the program SCNTEST.COM on your diskette in Drive A. To test it, enter SCNTEST at the MS-DOS prompt, go into BASIC and generate a screen of graphics, then hold down the SHIFT key and press the PRINT key. Anything on the screen should now be reproduced by the printer.

To suppress the linefeed character, (you need to do this if you get a blank line between lines in the printout) do this:

```
A> debug scntest.com
- e1b1 0 (If you need to change it back type in e1b1 0a)
- w
writing 032A bytes
- q
A>
```

This program uses Interrupt 5, (the SHIFT-PRINT keys causes this interrupt) and stays resident in memory once it has been called until the system is powered off or rebooted. You can run any program to generate your graphics and, as long as it does not interfere with Interrupt 5 or write over SCNTEST.COM in memory, you can use SHIFT-PRINT to get a screen dump.

SCNTEST has been tested with Tandy's DMP-105 and DMP-430 printers. It should work with the others in the DMP series as well, but it has not been tested with other printers. I hope you'll try it and let me know how it works. □

The listing:

```
-u100 32a

0D20:0100 E9FA01        JMP     02FD
0D20:0103 FB            STI
0D20:0104 E9B001        JMP     02B7
0D20:0107 90            NOP
0D20:0108 0000          ADD     [BX+SI],AL
```

Peter Lee holds a bachelor of science degree and works as a programmer/consultant. He enjoys skiing and fishing in his spare time.

```
ØD2Ø:Ø1ØA ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø1ØC ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø1ØE ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø11Ø EBØE        JMP     Ø12Ø
ØD2Ø:Ø112 ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø114 ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø116 ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø118 ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø11A ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø11C ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø11E ØØØØ        ADD     [BX+SI],AL
ØD2Ø:Ø12Ø 5Ø          PUSH    AX
ØD2Ø:Ø121 53          PUSH    BX
ØD2Ø:Ø122 51          PUSH    CX
ØD2Ø:Ø123 52          PUSH    DX
ØD2Ø:Ø124 1E          PUSH    DS
ØD2Ø:Ø125 Ø6          PUSH    ES
ØD2Ø:Ø126 B8ØØB8      MOV     AX,B8ØØ
ØD2Ø:Ø129 8ECØ        MOV     ES,AX
ØD2Ø:Ø12B 31CØ        XOR     AX,AX
ØD2Ø:Ø12D 2E          CS:
ØD2Ø:Ø12E A312Ø1      MOV     [Ø112],AX
ØD2Ø:Ø131 BØ12        MOV     AL,12
ØD2Ø:Ø133 3ØE4        XOR     AH,AH
ØD2Ø:Ø135 31D2        XOR     DX,DX
ØD2Ø:Ø137 CD17        INT     17
ØD2Ø:Ø139 2E          CS:
ØD2Ø:Ø13A AØ13Ø1      MOV     AL,[Ø113]
ØD2Ø:Ø13D 3C5C        CMP     AL,5C
ØD2Ø:Ø13F 7CØ3        JL      Ø144
ØD2Ø:Ø141 EB65        JMP     Ø1A8
ØD2Ø:Ø143 9Ø          NOP
ØD2Ø:Ø144 E869ØØ      CALL    Ø1BØ
ØD2Ø:Ø147 B9FØ3E      MOV     CX,3EFØ
ØD2Ø:Ø14A 9Ø          NOP
ØD2Ø:Ø14B 9Ø          NOP
ØD2Ø:Ø14C 9Ø          NOP
ØD2Ø:Ø14D 9Ø          NOP
ØD2Ø:Ø14E 9Ø          NOP
ØD2Ø:Ø14F 2E          CS:
ØD2Ø:Ø15Ø AØ13Ø1      MOV     AL,[Ø113]
ØD2Ø:Ø153 B3Ø7         MOV     BL,Ø7
ØD2Ø:Ø155 F6E3        MUL     BL
ØD2Ø:Ø157 89CB        MOV     BX,CX
ØD2Ø:Ø159 B1Ø3         MOV     CL,Ø3
ØD2Ø:Ø15B D3E8        SHR     AX,CL
ØD2Ø:Ø15D Ø1D8        ADD     AX,BX
ØD2Ø:Ø161 2E          CS:
ØD2Ø:Ø162 89ØE14Ø1    MOV     [Ø114],CX
ØD2Ø:Ø166 E858ØØ      CALL    Ø1C1
ØD2Ø:Ø169 2E          CS:
ØD2Ø:Ø16A A114Ø1      MOV     AX,[Ø114]
ØD2Ø:Ø16D 3DØØØØ      CMP     AX,ØØØØ
ØD2Ø:Ø17Ø 7CØ7         JL      Ø179
ØD2Ø:Ø172 3D4FØØ      CMP     AX,ØØ4F
ØD2Ø:Ø175 7FØ2         JG      Ø179
ØD2Ø:Ø177 EB16        JMP     Ø18F
ØD2Ø:Ø179 3D4Ø1F      CMP     AX,1F4Ø
ØD2Ø:Ø17C 7CØ5         JL      Ø183
ØD2Ø:Ø17E 2DØØ2Ø      SUB     AX,2ØØØ
ØD2Ø:Ø181 EBØ3         JMP     Ø186
ØD2Ø:Ø183 Ø5BØ1F      ADD     AX,1FBØ
ØD2Ø:Ø186 2E          CS:
ØD2Ø:Ø187 A314Ø1      MOV     [Ø114],AX
ØD2Ø:Ø18A E834ØØ      CALL    Ø1C1
ØD2Ø:Ø18D EBDA        JMP     Ø169
ØD2Ø:Ø18F 2E          CS:
ØD2Ø:Ø19Ø A12Ø1       MOV     AL,[Ø112]
ØD2Ø:Ø193 Ø4Ø1         ADD     AL,Ø1
ØD2Ø:Ø195 24Ø7        AND     AL,Ø7
ØD2Ø:Ø197 2E          CS:
ØD2Ø:Ø198 A212Ø1      MOV     [Ø112],AL
ØD2Ø:Ø19B 9Ø          NOP
ØD2Ø:Ø19C 2E          CS:
ØD2Ø:Ø19D AØ13Ø1      MOV     AL,[Ø113]
ØD2Ø:Ø1AØ Ø4Ø1         ADD     AL,Ø1
ØD2Ø:Ø1A2 2E          CS:
ØD2Ø:Ø1A3 A213Ø1      MOV     [Ø113],AL
ØD2Ø:Ø1A6 EB91        JMP     Ø139
ØD2Ø:Ø1A8 Ø7          POP     ES
ØD2Ø:Ø1A9 1F          POP     DS
ØD2Ø:Ø1AA 5A          POP     DX
ØD2Ø:Ø1AB 59          POP     CX
ØD2Ø:Ø1AC 5B          POP     BX
ØD2Ø:Ø1AD 58          POP     AX
ØD2Ø:Ø1AE C3          RET
ØD2Ø:Ø1AF 9Ø          NOP
ØD2Ø:Ø1BØ BØØA        MOV     AL,ØA
ØD2Ø:Ø1B2 3ØE4        XOR     AH,AH
ØD2Ø:Ø1B4 31D2        XOR     DX,DX
ØD2Ø:Ø1B6 CD17        INT     17
ØD2Ø:Ø1B8 BØØD        MOV     AL,ØD
ØD2Ø:Ø1BA 3ØE4        XOR     AH,AH
ØD2Ø:Ø1BC 31D2        XOR     DX,DX
ØD2Ø:Ø1BE CD17        INT     17
ØD2Ø:Ø1CØ C3          RET
ØD2Ø:Ø1C1 5Ø          PUSH    AX
ØD2Ø:Ø1C2 53          PUSH    BX
ØD2Ø:Ø1C3 51          PUSH    CX
ØD2Ø:Ø1C4 52          PUSH    DX
ØD2Ø:Ø1C5 1E          PUSH    DS
ØD2Ø:Ø1C6 Ø6          PUSH    ES
ØD2Ø:Ø1C7 2E          CS:
ØD2Ø:Ø1C8 8B1E14Ø1    MOV     BX,[Ø114]
ØD2Ø:Ø1CC 26          ES:
ØD2Ø:Ø1CD 8A27        MOV     AH,[BX]
ØD2Ø:Ø1CF 2E          CS:
ØD2Ø:Ø1DØ AØ13Ø1      MOV     AL,[Ø113]
ØD2Ø:Ø1D3 3C5B        CMP     AL,5B
ØD2Ø:Ø1D5 74Ø6        JZ      Ø1DD
ØD2Ø:Ø1D7 26          ES:
ØD2Ø:Ø1D8 8A47Ø1      MOV     AL,[BX+Ø1]
ØD2Ø:Ø1DB EBØ2        JMP     Ø1DF
ØD2Ø:Ø1DD 3ØCØ        XOR     AL,AL
ØD2Ø:Ø1DF 9Ø          NOP
ØD2Ø:Ø1EØ 9Ø          NOP
ØD2Ø:Ø1E1 9Ø          NOP
ØD2Ø:Ø1E2 2E          CS:
ØD2Ø:Ø1E3 8A1E12Ø1    MOV     BL,[Ø112]
ØD2Ø:Ø1E7 8ØFBØØ      CMP     BL,ØØ
ØD2Ø:Ø1EA 75Ø5         JNZ     Ø1F1
ØD2Ø:Ø1EC DØEC        SHR     AH,1
ØD2Ø:Ø1EE EB7A        JMP     Ø26A
ØD2Ø:Ø1FØ 9Ø          NOP
ØD2Ø:Ø1F1 8ØFBØ1      CMP     BL,Ø1
ØD2Ø:Ø1F4 751Ø         JNZ     Ø2Ø6
ØD2Ø:Ø1F6 8ØE4Ø1      AND     AH,Ø1
ØD2Ø:Ø1F9 B1Ø6         MOV     CL,Ø6
ØD2Ø:Ø1FB D2E4        SHL     AH,CL
ØD2Ø:Ø1FD B1Ø2         MOV     CL,Ø2
ØD2Ø:Ø1FF D2E8        SHR     AL,CL
ØD2Ø:Ø2Ø1 Ø8C4         OR      AH,AL
ØD2Ø:Ø2Ø3 EB65        JMP     Ø26A
ØD2Ø:Ø2Ø5 9Ø          NOP
ØD2Ø:Ø2Ø6 8ØFBØ2      CMP     BL,Ø2
ØD2Ø:Ø2Ø9 751Ø         JNZ     Ø21B
ØD2Ø:Ø2ØB 8ØE4Ø3      AND     AH,Ø3
ØD2Ø:Ø2ØE B1Ø5         MOV     CL,Ø5
```

Grow up!

Wondering where to grow?

Why not get IBM compatibility with Tandy's 1200, or the new 3000, and take your OS-9 programs with you?

TLM's PC68K puts the 68000/68010 processor and Microware's OS-9 together in any IBM, or compatible, PC/XT/AT system, providing the best of both worlds with fully concurrent PC/68000 operation.

- Powerful languages such as BASIC09, PASCAL and C
- DYNACALC for spread sheet processing
- The power of the 68000/68010
- The price/performance and flexibility of the Tandy 1200 and 3000

TLM's PC68K. . . A great family to grow up with!

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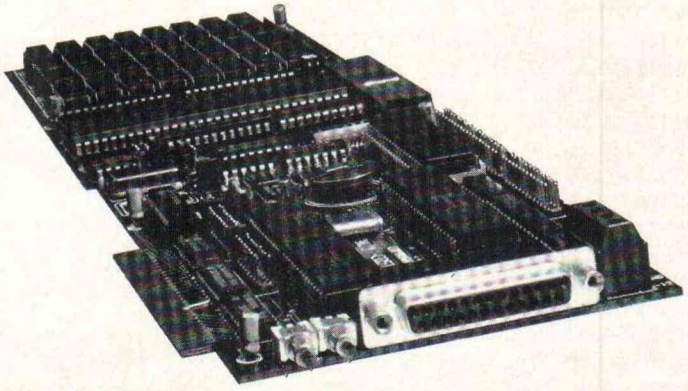


CLOCK SPEED
8/10/12.5 MHZ
Without wait states

HARDWARE
2 Parallel Ports
3-9 Serial Ports
68881 Floating point co-processor (optional)
Memory mapped dual port bus for high speed DMA transfers
Real time clock with battery backup
Up to 16 boards can run concurrently from one AT/XT/PC bus

MEMORY
1-2 MB OF RAM
(1 MB on board standard)
8K-32K of ROM
2K-8K of battery backed RAM

MULTI-USER
3-9 users (3 standard)
High speed "Tick" timer with 10ms accuracy for efficient multi-user time slicing.

OPERATING SYSTEMS
OS-9 (Multi-user UNIX look-alike)
C/PM-68K (popular single user OS)
Both support concurrent access to PC DOS

SOFTWARE
Software selectable OS environment
IBM Color/Mono Graphics Support
Local and Global disk caching for maximum speed and efficient data transfer

COMMUNICATIONS
Powerful asynchronous/synchronous data communications capability
Bisynchronous SNA 3270, X.25, etc.

MISCELLANEOUS FEATURES
Remote and Local reset (hardware or software selectable)
Remote and Local Non-maskable Interrupts (NMI)
Stand alone hardware capability (without AT/XT/PC support)

TLM Systems

West: 4704 W. Jennifer, Suite 105, Fresno, CA 93711 209/276-2345 / East: 67 Grandview Avenue, Pleasantville, NY 10570 914/747-1450

```
ØD2Ø:Ø21Ø D2E4          SHL     AH,CL
ØD2Ø:Ø212 B1Ø3          MOV     CL,Ø3
ØD2Ø:Ø214 D2E8          SHR     AL,CL
ØD2Ø:Ø216 Ø8C4          OR      AH,AL
ØD2Ø:Ø218 EB5Ø          JMP     Ø26A
ØD2Ø:Ø21A 9Ø            NOP
ØD2Ø:Ø21B 8ØFBØ3        CMP     BL,Ø3
ØD2Ø:Ø21E 751Ø          JNZ     Ø23Ø
ØD2Ø:Ø22Ø 8ØE4Ø7        AND     AH,Ø7
ØD2Ø:Ø223 B1Ø4          MOV     CL,Ø4
ØD2Ø:Ø225 D2E4          SHL     AH,CL
ØD2Ø:Ø227 B1Ø4          MOV     CL,Ø4
ØD2Ø:Ø229 D2E8          SHR     AL,CL
ØD2Ø:Ø22B Ø8C4          OR      AH,AL
ØD2Ø:Ø22D EB3B          JMP     Ø26A
ØD2Ø:Ø22F 9Ø            NOP
ØD2Ø:Ø23Ø 8ØFBØ4        CMP     BL,Ø4
ØD2Ø:Ø233 751Ø          JNZ     Ø245
ØD2Ø:Ø235 8ØE4ØF        AND     AH,ØF
ØD2Ø:Ø238 B1Ø3          MOV     CL,Ø3
ØD2Ø:Ø23A D2E4          SHL     AH,CL
ØD2Ø:Ø23C B1Ø5          MOV     CL,Ø5
ØD2Ø:Ø23E D2E8          SHR     AL,CL
ØD2Ø:Ø24Ø Ø8C4          OR      AH,AL
ØD2Ø:Ø242 EB26          JMP     Ø26A
ØD2Ø:Ø244 9Ø            NOP
ØD2Ø:Ø245 8ØFBØ5        CMP     BL,Ø5
ØD2Ø:Ø248 751Ø          JNZ     Ø25A
ØD2Ø:Ø24A 8ØE41F        AND     AH,1F
ØD2Ø:Ø24D B1Ø2          MOV     CL,Ø2
ØD2Ø:Ø24F D2E4          SHL     AH,CL
ØD2Ø:Ø251 B1Ø6          MOV     CL,Ø6
ØD2Ø:Ø253 D2E8          SHR     AL,CL
ØD2Ø:Ø255 Ø8C4          OR      AH,AL
ØD2Ø:Ø257 EB11          JMP     Ø26A
ØD2Ø:Ø259 9Ø            NOP
ØD2Ø:Ø25A 8ØFBØ6        CMP     BL,Ø6
ØD2Ø:Ø25D 75ØB          JNZ     Ø26A
ØD2Ø:Ø25F 8ØE43F        AND     AH,3F
ØD2Ø:Ø262 DØE4          SHL     AH,1
ØD2Ø:Ø264 B1Ø7          MOV     CL,Ø7
ØD2Ø:Ø266 D2E8          SHR     AL,CL
ØD2Ø:Ø268 Ø8C4          OR      AH,AL
ØD2Ø:Ø26A 8ØE47F        AND     AH,7F
ØD2Ø:Ø26D 3ØCØ          XOR     AL,AL
ØD2Ø:Ø26F F6C4Ø1        TEST    AH,Ø1
ØD2Ø:Ø272 74Ø2          JZ      Ø276
ØD2Ø:Ø274 ØC4Ø          OR      AL,4Ø
ØD2Ø:Ø276 F6C4Ø2        TEST    AH,Ø2
ØD2Ø:Ø279 74Ø2          JZ      Ø27D
ØD2Ø:Ø27B ØC2Ø          OR      AL,2Ø
ØD2Ø:Ø27D F6C4Ø4        TEST    AH,Ø4
ØD2Ø:Ø28Ø 74Ø2          JZ      Ø284
ØD2Ø:Ø282 ØC1Ø          OR      AL,1Ø
ØD2Ø:Ø284 F6C4Ø8        TEST    AH,Ø8
ØD2Ø:Ø287 74Ø2          JZ      Ø28B
ØD2Ø:Ø289 ØCØ8          OR      AL,Ø8
ØD2Ø:Ø28B F6C41Ø        TEST    AH,1Ø
ØD2Ø:Ø28E 74Ø2          JZ      Ø292
ØD2Ø:Ø29Ø ØCØ4          OR      AL,Ø4
ØD2Ø:Ø292 F6C42Ø        TEST    AH,2Ø
ØD2Ø:Ø295 74Ø2          JZ      Ø299
ØD2Ø:Ø297 ØCØ2          OR      AL,Ø2
ØD2Ø:Ø299 F6C44Ø        TEST    AH,4Ø
ØD2Ø:Ø29C 74Ø2          JZ      Ø2AØ
ØD2Ø:Ø29E ØC Ø1         OR      AL,Ø1
ØD2Ø:Ø2AØ ØC8Ø          OR      AL,8Ø
ØD2Ø:Ø2A2 3ØE4          XOR     AH,AH
ØD2Ø:Ø2A4 31D2          XOR     DX,DX
ØD2Ø:Ø2A6 CD17          INT     17
ØD2Ø:Ø2A8 BØ8Ø          MOV     AL,8Ø
ØD2Ø:Ø2AA 3ØE4          XOR     AH,AH
ØD2Ø:Ø2AC 31D2          XOR     DX,DX
ØD2Ø:Ø2AE CD17          INT     17
ØD2Ø:Ø2BØ Ø7            POP     ES
ØD2Ø:Ø2B1 1F            POP     DS
ØD2Ø:Ø2B2 5A            POP     DX
ØD2Ø:Ø2B3 59            POP     CX
ØD2Ø:Ø2B4 5B            POP     BX
ØD2Ø:Ø2B5 58            POP     AX
ØD2Ø:Ø2B6 C3            RET
ØD2Ø:Ø2B7 5Ø            PUSH    AX
ØD2Ø:Ø2B8 53            PUSH    BX
ØD2Ø:Ø2B9 51            PUSH    CX
ØD2Ø:Ø2BA 52            PUSH    DX
ØD2Ø:Ø2BB 1E            PUSH    DS
ØD2Ø:Ø2BC Ø6            PUSH    ES
ØD2Ø:Ø2BD B84ØØØ        MOV     AX,ØØ4Ø
ØD2Ø:Ø2CØ 8ED8          MOV     DS,AX
ØD2Ø:Ø2C2 AØ49ØØ        MOV     AL,[ØØ49]
ØD2Ø:Ø2C5 3CØ4          CMP     AL,Ø4
ØD2Ø:Ø2C7 73ØB          JNB     Ø2D4
ØD2Ø:Ø2C9 Ø7            POP     ES
ØD2Ø:Ø2CA 1F            POP     DS
ØD2Ø:Ø2CB 5A            POP     DX
ØD2Ø:Ø2CC 59            POP     CX
ØD2Ø:Ø2CD 5B            POP     BX
ØD2Ø:Ø2CE 58            POP     AX
ØD2Ø:Ø2CF 2E            CS:
ØD2Ø:Ø2DØ FF2E16Ø1      JMP     FAR [Ø116]
ØD2Ø:Ø2D4 31CØ          XOR     AX,AX
ØD2Ø:Ø2D6 8ED8          MOV     DS,AX
ØD2Ø:Ø2D8 AØØØØ5        MOV     AL,[Ø5ØØ]
ØD2Ø:Ø2DB 3CØ1          CMP     AL,Ø1
ØD2Ø:Ø2DD 75Ø2          JNZ     Ø2E1
ØD2Ø:Ø2DF EB15          JMP     Ø2F6
ØD2Ø:Ø2E1 C6Ø6ØØØ5Ø1    MOV     BYTE PTR [Ø5ØØ],Ø1
ØD2Ø:Ø2E6 E837FE        CALL    Ø12Ø
ØD2Ø:Ø2E9 BØ1E          MOV     AL,1E
ØD2Ø:Ø2EB 3ØE4          XOR     AH,AH
ØD2Ø:Ø2ED 31D2          XOR     DX,DX
ØD2Ø:Ø2EF CD17          INT     17
ØD2Ø:Ø2F1 C6Ø6ØØØ5ØØ    MOV     BYTE PTR [Ø5ØØ],ØØ
ØD2Ø:Ø2F6 Ø7            POP     ES
ØD2Ø:Ø2F7 1F            POP     DS
ØD2Ø:Ø2F8 5A            POP     DX
ØD2Ø:Ø2F9 59            POP     CX
ØD2Ø:Ø2FA 5B            POP     BX
ØD2Ø:Ø2FB 58            POP     AX
ØD2Ø:Ø2FC CF            IRET
ØD2Ø:Ø2FD B89Ø9Ø        MOV     AX,9Ø9Ø
ØD2Ø:Ø3ØØ 2E            CS:
ØD2Ø:Ø3Ø1 A3ØØØ1        MOV     [Ø1ØØ],AX
ØD2Ø:Ø3Ø4 2E            CS:
ØD2Ø:Ø3Ø5 A2Ø2Ø1        MOV     [Ø1Ø2],AL
ØD2Ø:Ø3Ø8 31CØ          XOR     AX,AX
ØD2Ø:Ø3ØA 8ED8          MOV     DS,AX
ØD2Ø:Ø3ØC A1 14ØØ       MOV     AX,[ØØ14]
ØD2Ø:Ø3ØF 2E            CS:
ØD2Ø:Ø31Ø A316Ø1        MOV     [Ø116],AX
ØD2Ø:Ø313 A116ØØ        MOV     AX,[ØØ16]
ØD2Ø:Ø316 2E            CS:
ØD2Ø:Ø317 A318Ø1        MOV     [Ø118],AX
ØD2Ø:Ø31A B8ØØØ1        MOV     AX,Ø1ØØ
ØD2Ø:Ø31D A314ØØ        MOV     [ØØ14],AX
ØD2Ø:Ø32Ø 8CC8          MOV     AX,CS
ØD2Ø:Ø322 A316ØØ        MOV     [ØØ16],AX
ØD2Ø:Ø325 BAFDØ2        MOV     DX,Ø2FD
ØD2Ø:Ø328 CD27          INT     27
ØD2Ø:Ø32A ØØØØ          ADD     [BX+SI],AL
-q
```

PCM

It's the Holmes Engineering/PCSG "chipmunk"

PORTABLE Disk Drive

AS FAST AS RAM

for the Model 100/200

NEW LOW PRICE
$499.

Includes a library of six powerful programs

NOW AVAILABLE ON THE M-200

ASK ABOUT BUDGET MODEL $399.

Uses the main menu concept. You see the disk directory instantly, arranged on your M-100 screen like your main menu. Just move the widebar cursor and transfer files with a function key. You can run a file directly from the diskette with the ENTER key. Uses 3½" microfloppy diskettes that have a rigid plastic casing and a metal core. They're tough and nonflexible. You can carry several in a shirt pocket without damage. There's 358K on a diskette. Ten of these in your briefcase and you've got 3½ megabytes.

Drive weighs only three lbs. and it works directly from the 110 outlet and recharges at the same time. It recharges in six hours with thousands of pages transferred between charges. It's compact, with dimensions of 2¼" x 5½" x 7.5"; and fits easily into your briefcase along with your Model 100 or 200.

Machine code programs, BASIC programs, *Lucid* files and documents all are saved and retrieved with no protocol–instantly, ready to run.

In a special association, Holmes Engineering and PCSG have worked together combining the hardware knowledge of Holmes and the software expertise of PCSG. The result is a product that can only be regarded as excellent.

You see the disk directory instantly; works just like the main menu

Here is what is really exciting. The portable disk drive has Random Access. Included as part of the operating system in the drive (ROM) is a very powerful disk BASIC.

This means that you can have BASIC programs that will access the diskette and read and write records directly on the diskette.

Just imagine yourself with this kind of capability.

Database – The portable disk drive stores your mailing list, inventory items, part #s and descriptions or any other data that you need to recall.

358K on a diskette

Invoice (purchase order) – At the touch of a button you can print out your sequentially numbered, professionally done invoices. This is truly professional invoicing capability.

Purchase orders are just as easy.

Sort – This excellent utility allows you rapid sorting of any records you have compiled. You can write the newly sorted list back in the same file on the diskette or to a new file.

Telecom interface – If you are a user that likes to access other computers or databases (for example CompuServe) by telephone then this powerful facility alone is worth the price of the disk drive. You can automatically download and upload information onto the diskette.

Calendar – Everyone who has seen this program has said, "This is the first calendar/diary/scheduler on any computer anywhere that I can use. It is so functional."

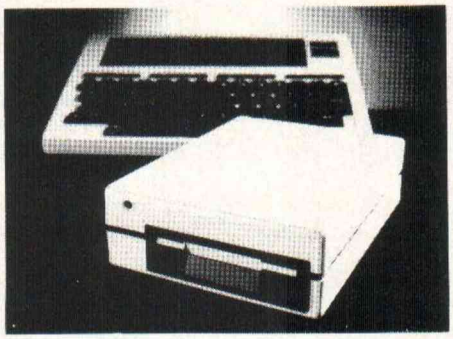
The calendar program is usable for two reasons, first it is designed correctly, and second you have the memory (358K) on the diskette to log and access a tremendous amount of notes over a long period of time.

Personal Finance Manager – This wonderful program truly lets you keep track of your finances.

All your records are kept on the diskette. Bank accounts (checking and savings) and charge accounts such as MasterCard and Visa.

We at PCSG believe we have the ultimate Model 100 system, the Portable Disk Drive plus the *Lucid* spreadsheet on snap-in ROM, *Write ROM* word processing and the new 64K RAM expansion now available from PCSG.

We want you to find out for yourself at no risk. If you aren't totally satisfied within 30 days, simply return the disk drive for a full refund. Priced at $499.00, including the software library. MasterCard, Visa, COD.



PORTABLE COMPUTER SUPPORT GROUP

1-214-351-0564

11035 Harry Hines Blvd., #207
Dallas, Texas 75229

PCSG offers a 30-day/money-back trial!

The following program listings were omitted from "Fun with Filters," January 1986, Page 48.

Listing of: SCRDISK.BAS

```
4ØØØØ REM SCRDISK
4ØØ1Ø DEF SEG=&HEØØØ
4ØØ2Ø OUT &H1AØ,&H31
4ØØ3Ø BSAVE"B:FILE1",Ø,32ØØØ
4ØØ4Ø OUT &H1AØ,&H32
4ØØ5Ø BSAVE"B:FILE2",Ø,32ØØØ
4ØØ6Ø OUT &H1AØ,&H34
4ØØ7Ø BSAVE"B:FILE3",Ø,32ØØØ
```

Listing of: DISKSCR.BAS

```
4ØØØØ REM DISKSCR
4ØØ1Ø SCREEN Ø:CLS:KEY OFF:SCREEN 3:COLOR 1,1
4ØØ2Ø OUT &H1AØ,&H31
4ØØ3Ø BLOAD"B:FILE1"
4ØØ4Ø OUT &H1AØ,&H32
4ØØ5Ø BLOAD"B:FILE2"
4ØØ6Ø OUT &H1AØ,&H34
4ØØ7Ø BLOAD"B:FILE3"
```

Listing of: FGRIDLNE.BAS

```
6ØØØØ REM FGRIDLNE
6ØØ1Ø Y1=Ø:Y2=4ØØ
6ØØ2Ø FOR X=Ø TO 64Ø STEP 3
6ØØ3Ø LINE(X,Y1)-(X,Y2),1
6ØØ4Ø NEXT X
6ØØ5Ø X1=Ø:X2=64Ø
6ØØ6Ø FOR Y=Ø TO 4ØØ STEP 3
6ØØ7Ø LINE(X1,Y)-(X2,Y),1
6ØØ8Ø NEXT Y
```

Listing of: FHORIZN.BAS

```
6ØØØØ REM FHORIZN
6ØØ1Ø X1=Ø:X2=64Ø
6ØØ2Ø FOR Y=Ø TO 4ØØ STEP 3
6ØØ3Ø LINE(X1,Y)-(X2,Y),1
6ØØ4Ø NEXT Y
```

Listing of: FGRIDOTS.BAS

```
6ØØØØ REM FGRIDOTS
6ØØ1Ø FOR X=Ø TO 64Ø STEP 3
6ØØ2Ø FOR Y=Ø TO 4ØØ STEP 3
6ØØ3Ø PSET(X,Y),1
6ØØ4Ø NEXT Y
6ØØ5Ø NEXT X
```

Listing of: FOVALDOT.BAS

```
6ØØØØ REM FOVALDOT
6ØØ1Ø E=1
6ØØ2Ø FOR R=E TO 125 STEP 2
6ØØ3Ø FOR A=-R TO R
6ØØ4Ø X=(R*R-A*A)
6ØØ5Ø Y=SQR(X)
6ØØ6Ø Y=INT(Y-.5)
6ØØ7Ø PSET(2*(A+3Ø)+26Ø,23-Y+17Ø),7
6ØØ8Ø PSET(2*(A+3Ø)+26Ø,23+Y+17Ø),5
6ØØ9Ø NEXT A
6Ø1ØØ NEXT R
```

Listing of: FGRIDTH.BAS

```
6ØØØØ REM FGRIDTH
6ØØ1Ø FOR Y=Ø TO 4ØØ STEP 3
6ØØ2Ø FOR X=Ø TO 64Ø STEP 3
6ØØ3Ø PSET(X,Y),4
6ØØ4Ø NEXT X
6ØØ5Ø NEXT Y
```

Listing of: FBORDER.BAS

```
6ØØØØ REM FBORDER
6ØØ1Ø LINE(1,1)-(638,398),4,B
6ØØ2Ø LINE(Ø,Ø)-(639,399),4,B
6ØØ3Ø LINE(5,5)-(634,394),4,B
6ØØ4Ø LINE(2,2)-(637,397),4,B
6ØØ5Ø LINE(4,4)-(635,395),4,B
6ØØ6Ø LINE(3,3)-(636,396),4,B
6ØØ7Ø LINE(6,6)-(633,393),6,B
```

Listing of: FCOSINE.BAS

```
6ØØØØ REM FCOSINE
6ØØ1Ø FOR I=1 TO 639 STEP 5
6ØØ2Ø LINE(I+3,Ø)-(639,I),1
6ØØ3Ø LINE(639-(I+3),399)-(Ø,399-I),2
6ØØ4Ø LINE(Ø,399-I)-(I,Ø),3
6ØØ5Ø LINE(639,I)-(639-I,399),4
6ØØ6Ø NEXT I
```

Listing of: FVERTICL.BAS

```
60000 REM FVERTICL
60010 Y1=0:Y2=400
60020 FOR X=0 TO 640 STEP 3
60030 LINE(X,Y1)-(X,Y2),1
60040 NEXT X
```

Listing of: FDIAGLFT.BAS

```
60000 REM FDIAGLFT
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
```

Listing of: FDIAGRHT.BAS

```
60000 Y1=400:Y2=0
60010 FOR X=639 TO 0 STEP -12
60020 LINE(640,400)-(X,Y2),1
60030 NEXT X
60040 X1=640:X2=0
60050 FOR Y=399 TO 0 STEP -12
60060 LINE(640,400)-(X2,Y),1
60070 NEXT Y
60080 Y1=0:Y2=400
60090 FOR X=640 TO 0 STEP -12
60100 LINE(640,0)-(X,Y2),1
60110 NEXT X
60120 X1=640:X2=0
60130 FOR Y=0 TO 399 STEP 12
60140 LINE(640,0)-(X2,Y),1
60150 NEXT Y
```

Listing of: FDIAGLDN.BAS

```
60000 REM FDIAGLDN
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
```

Listing of: FDIAGLR2.BAS

```
60000 REM FDIAGLR2
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(640,400)-(X,Y2),1
60040 NEXT X
60050 X1=640:X2=0
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(640,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
```

Listing of: FDIAGLUP.BAS

```
60000 REM FDIAGLUP
60010 Y1=0:Y2=400
60020 FOR X=1 TO 639 STEP 12
60030 LINE(0,0)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=0 TO 399 STEP 12
60070 LINE(0,0)-(X2,Y),1
60080 NEXT Y
```

Listing of: FDIAGPLS.BAS

```
60000 REM FDIAGPLS
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
60170 Y1=400:Y2=0
60180 FOR X=639 TO 0 STEP -12
60190 LINE(640,400)-(X,Y2),1
60200 NEXT X
60210 X1=640:X2=0
60220 FOR Y=399 TO 0 STEP -12
60230 LINE(640,400)-(X2,Y),1
60240 NEXT Y
60250 Y1=0:Y2=400
60260 FOR X=640 TO 0 STEP -12
60270 LINE(640,0)-(X,Y2),1
60280 NEXT X
60290 X1=640:X2=0
60300 FOR Y=0 TO 399 STEP 12
60310 LINE(640,0)-(X2,Y),1
60320 NEXT Y
60330 Y1=0:Y2=400
60340 FOR X=0 TO 640 STEP 3
60350 LINE(X,Y1)-(X,Y2),0
60360 NEXT X
60370 X1=0:X2=640
60380 FOR Y=0 TO 400 STEP 3
60390 LINE(X1,Y)-(X2,Y),0
60400 NEXT Y
```

Listing of: FDIAGLR4.BAS

```
60000 REM FDIAGLR4
60010 Y1=400:Y2=0
60020 FOR X=639 TO 0 STEP -12
60030 LINE(0,400)-(X,Y2),1
60040 NEXT X
60050 X1=0:X2=640
60060 FOR Y=399 TO 0 STEP -12
60070 LINE(0,400)-(X2,Y),1
60080 NEXT Y
60090 Y1=0:Y2=400
60100 FOR X=1 TO 639 STEP 12
60110 LINE(0,0)-(X,Y2),1
60120 NEXT X
60130 X1=0:X2=640
60140 FOR Y=0 TO 399 STEP 12
60150 LINE(0,0)-(X2,Y),1
60160 NEXT Y
60170 Y1=400:Y2=0
60180 FOR X=639 TO 0 STEP -12
60190 LINE(640,400)-(X,Y2),1
60200 NEXT X
60210 X1=640:X2=0
60220 FOR Y=399 TO 0 STEP -12
60230 LINE(640,400)-(X2,Y),1
60240 NEXT Y
60250 Y1=0:Y2=400
60260 FOR X=640 TO 0 STEP -12
60270 LINE(640,0)-(X,Y2),1
60280 NEXT X
60290 X1=640:X2=0
60300 FOR Y=0 TO 399 STEP 12
60310 LINE(640,0)-(X2,Y),1
60320 NEXT Y
```

Listing of: FCIRCLE.BAS

```
60000 REM FCIRCLE
60010 FOR X=1 TO 390 STEP 3
60020 CIRCLE(320,200),X,4
60030 NEXT X
```

Knowing what's going on behind the scenes of BASIC can help improve programming techniques

Interpreting BASIC's Interpreter

By Dan Keen

It is important to understand how the BASIC interpreter in your computer "interprets" or acts in given situations. BASIC can give some seemingly strange responses to certain statements. We must be able to predict how our particular version of BASIC will handle instructions.

In this article, we will take a brief look at the way BASIC thinks, see ways to speed up program execution and explore some of the screwy aspects of BASIC.

Order of Operations

BASIC makes certain assumptions. It also performs operations in a predictable fashion. To first demonstrate those points, let's examine BASIC's "order of operation."

When BASIC executes math expressions, it follows a systematic order. First, it performs calculations that are inside parentheses. Next, it performs multiplication or division operations proceding left to right through the expression. Finally, any addition or subtraction is done, again, going left to right.

The importance of knowing how the computer will handle an expression can be demonstrated with the following statement:

```
X = 10 / 5 * 2
```

It says, variable X equals 10 divided by five multiplied by two. If we multiply five by two, we get 10. If we then divide 10 by 10, we arrive at a value of one for X. However, if we first divide 10 by five, resulting in two, and multiply that by two, X would be four. So here is a problem which could have two answers! Which way will the machine do it? Following our rules for "order of operations," we see that the computer works from left to the right of the expression. Therefore, the correct answer four.

Try this one:

```
N = 2 * 2 + (3+1)
```

The value of N could be either four or 12, depending on which operations you perform first. What value will N be when this statement is run under BASIC?

Two Equal Signs

At first glance, you might think the following statement would generate a syntax error:

```
20 LET A = B = C
```

Surprisingly, it does not! Try it on your computer. Many versions of BASIC interpret the second equal sign as a *logical operator.* In other words, it kind of acts like an IF/THEN statement and a boolean algebra computation.

In logic comparisions, two states can exist, "true" and "false." BASIC interpreters typically return values of zero if a test is false and -1 if true (or some non-zero value). Therfore, the statement LET A = B = C will be interpreted by BASIC to say "if B is equal to C, assign A a value of -1; otherwise, assign A a value of zero." It could be rewritten as:

```
IF B = C THEN A = -1 ELSE A = 0
```

The advantage of using A=B=C over the IF/THEN statement is obviously brevity. Although it is legal, many programmers may frown upon its use since it is not as clear to the person looking at the program listing as the IF statement would be. One of the drawbacks to BASIC compared to other programming languages is its inherent lack of documentation. Such statements as this make it all the harder to figure out what is going on in a program.

Logical operators are interesting, and you may wish to study the sections on AND, OR and NOT in your BASIC owner's manual for more information.

More BASIC Assumptions

BASIC may alter things you type in. Key in this statement:

```
10 N = 0000
```

Now list the program. Even though you have not edited nor run the program, BASIC has made a change. The line now reads

```
10 N = 0
```

Under GW-BASIC on the Tandy 1000 and 2000, we tried entering this statement:

```
10 N = 123456789
```

Again, BASIC shows it has a mind of its own. Typing LIST now reveals that BASIC stuck a pound sign (#) on the tail end of the number:

```
10 N = 123456789#
```

Speeding up Exectuion

By knowing a few things about BASIC, we can speed up the execution of our BASIC programs.

Most programmers know a few tricks for speeding up programs and saving bytes of memory, such as deleting all REM statements, using multi-statement lines when possible, using subroutines and not over dimensioning arrays.

Perhaps you might not be aware of some other tricks. Structure your calculations so as to use as few parentheses as possible (it takes several bytes to process parentheses).

Subroutines should be placed at the beginning of a program. DATA statements should also be located among the first few lines of the program. When the computer encounters a READ statement, it begins searching from the top of the program for DATA. Naturally, if the DATA is located in one of the first lines of the program, it doesn't have to look very long to find it.

Subscripted variables (arrays) should be avoided in calculations and in FOR/NEXT loops.

Use frequently-defined variables early in the execution of a program.

BASIC develops variable lists as the program progresses. Those first used are first on the list, and so will be found the quickest.

When string variables are no longer used in a program, null them out by setting them equal to a null string (A$=""). Nulling a string variable changes its length to zero. BASIC will have to do less searching since this minimizes the number of variables in use.

Conclusion

Hopefully, we have presented some useful programming techniques and stimulated you to experiment with your version of BASIC. Books and manuals don't tell you all the things you can do with a language. You have to read between the lines and log in some time sitting at your console. Making discoveries is the fun part of programming! □

MS-DOS Volume 1 An Excellent Tutorial

Book 1000/1200/2000/3000

MS-DOS, Volume 1, The Basics is the newest addition in the Tandy family of tutorial manuals. Written by David A. Lien and Gary Williams, this compact book is an introduction to MS-DOS and its use with the Tandy 1000, 1200HD and 2000 computers. The book is conveniently divided into an introduction and four parts.

The introduction, though only a few pages in length, clearly explains the general purpose of a disk operating system and gives a brief description of MS-DOS. It also states the book's theme: "This book will take you through the most basic commands and teach you how to do the things you're likely to need in your day-to-day use of the computer. From here on, you'll learn by doing." And learn by doing is the key approach throughout the book.

Part One is entitled "Startup to Shutdown." It consists of four chapters on the rudiments of MS-DOS. You are gently led through the initialization process of loading MS-DOS and setting the date and time. Also, there is a brief description of the system prompt. The book proceeds to describe several initial MS-DOS commands: DATE, TIME, DIR, CLS and PRINT. As is the general approach throughout the book, you are asked to enter the commands and view your computer's display, which should, if all goes well, be similar to the displays given in the book. This technique is a quick and easy way to learn; it is also a recognizable hallmark for those who are familar with David Lien's previous works.

The last chapter of Part One is a short but comprehensive review that outlines the commands and their functions, along with the authors' notes about the proper startup and shutdown procedures.

Part Two, "Using MS-DOS to Prepare Your Diskettes," begins with two brief paragraphs on the compatibility of the Tandy 1000 and 1200HD with the IBM PC. The authors conclude, "[compatibility] means software that runs on the IBM will usually run on these two machines." The key word, of course, is *usually.* Experience dictates that you should actually test, if possible, any IBM software on a Tandy before buying. Furthermore, the authors fail to consider the question of the compatibility of IBM software with the Tandy 2000, though generally IBM PC software will not operate on the 2000. The information given here is so sparse and impractical that the subject of compatibility could have been left out entirely.

The chapter continues with a brief but thorough discussion about disk capacities, both floppy and hard disks, and the differences in floppy diskette storage capacity among the three computers: Tandy 1000, 1200HD and 2000. Although this information has little to do with using MS-DOS, it is informative.

The remaining chapters of Part Two

deal with the practical side of using MS-DOS. Step-by-step explanations, along with examples, are given for formatting floppy diskettes and formatting a hard disk. At each step of the procedure, simulated displays are given which will help you through the process — particularly the formatting of a hard disk, which can be somewhat complicated. The discussion is clear, concise, and the explanations are uncluttered with technical jargon.

Following the presentation on formatting, the book covers the various procedures for copying files, whether you're using floppy diskettes or a hard disk. Detailed explanations are presented on how to use the formatting and copying commands of MS-DOS: HSECT, FDISK, CONFIGD, FORMAT, HFORMAT, BACKUP, RESTORE and COPY. Not all of these commands will work with all three Tandy computers. At appropriate junctions in the discussion, there are sections set aside explaining the differences in commands that exist among the three slightly-different MS-DOSs — an added feature which is quite helpful.

The remaining chapters of Part Two describe the MS-DOS commands for duplicating and checking diskettes: DISKCOMP (for the Tandy 1000 and 1200HD), COMPDUPE (for the Tandy 2000) and CHKDSK. These chapters will help you understand the importance of maintaining current backups of your diskettes, as the authors state, "backup copies of diskettes are a way of life with computers." Although the discussion is brief, it will help you to avoid the agony of lost data.

The last chapter of Part Two is a review of the MS-DOS commands covered in the previous chapters. The commands and their functions are listed under the specific Tandy computer for which they will work.

Part Three is entitled "Using MS-DOS to Manage Your Files." The first chapter begins by defining the three major categories of disk files: programs, data and system files. It continues by briefly discussing two other types: batch and BASIC files.

To illustrate the use of disk files, the authors list three BASIC programs which are used in subsequent discussions. The programs are short and simple. Detailed instructions are given for entering them into your computer.

Using the three BASIC program files, MATH.BAS, GREETING.BAS and CONVERT.BAS, the MS-DOS COPY command is discussed in detail. By the time you've gone through the explanations and examples, especially the chapter on shortcuts and wildcards, you'll be thoroughly familar with, if not an expert on, managing disk files.

The most important topics in the book, beginning with Chapter 19 and continuing through Chapter 24, are the creation and manipulation of data files via MS-DOS. The authors demonstrate how to combine, print, rename, sort and search files, by working through excellent examples. The commands presented are: COPY CON, COPY CON PRN, PRINT, RENAME, SORT and FIND. Here is where the real power of MS-DOS begins to shine. Using these commands in various combinations, the book clearly shows you how versatile MS-DOS is in managing files.

The last topic of the book is the MS-DOS text editor, EDLIN. EDLIN is not a command, but a stand alone utility program that allows you to create and edit your own disk files. It can also be

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used to create batch file "programs" that can perform tasks automatically. Since the program contains its own command structure and functions, the authors state: "we won't attempt to provide a complete course in EDLIN in this introductory book . . . Volume 2 covers the subject in full detail."

You are shown, though, how to create a sample file and how to use a few of EDLIN's commands for text insertion, text deletion, printing and saving the completed file. There is much more to EDLIN, but our appetites are sufficiently whetted for Volume 2.

The last chapter is an inclusive review of the material presented in Part Three. All of the MS-DOS commands are listed along with their functions and descriptions.

Overall, *MS-DOS, Volume 1, The Basics* is an excellent tutorial. It is written in a smooth, succinct style without the verbiage often found in other manuals. By the time you've gone through it — and you'll be amazed how little time it does take — you'll be anxiously awaiting Volume 2, as I am.

(Compusoft Publishing, 535 Broadway, El Cajon, California 92021, $7.95)

— Ralph Rideout

Software 1000/1200/2000/3000

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feature, when I was preparing my taxes with my accountant, I found out I was going to owe over $500 in additional taxes. We determined how much it would take to add to my IRA and Kroegh accounts to reduce my taxes to a small refund. It took less time to do it than trying to describe it here.

Creative Solutions has another nice feature available — the ability to generate annual pro-forma data sheets from year to year. This feature reduces the data entry time by transferring forward each year the information such as depreciation, taxes paid to state and the IRS, adjusted gross income for income averaging, the number of dependents and their names and other information necessary for the next tax year. It's nice to be able to start on the next year's taxes without having to re-enter all the client's information.

The 1040 Solution has other important features. It will automatically calculate the lowest tax alternative either by income averaging or the appropriate tax table. It will prepare three different Schedule C's and two different 2106s, handle six installment sales and nine schedule E rental units. It will also do subscheduling for Schedule B, Schedule E partnerships, estates and SBC's.

Even if you're not a tax accountant, this system has such easy data entry that with a few minutes of reading the easy-to-use manual, you can start preparing tax returns. The manual has on the left page a picture of the data entry screen for the appropriate form and the accompanying right page offers brief explanations of what data or codes need to be placed in each data field.

You can start with any data entry screen and the tax information can be entered in any order. It allows for spouse, joint or taxpayer attributes. There are express keys which allow you to move anywhere on the screen quickly and what you see is what you get. There are no tax line numbers to remember and all calculations are completed after the data is entered so there is no wait for calculation delays. A typical calculation time is in the 30- to 90-second range, even for some tough tax situations. Sales taxes for each state are automatically computed or can be overridden by the actual amount. You can get a quick review of the tax due/refund and all schedule amounts at any time. Any screen can also be easily dumped to the printer.

Perhaps the most important part of a good tax system is the ability to get the information to the IRS. *The 1040 Solution* has several options for the printing of the tax forms. First, the 1040 forms must be on the original forms which is easily handled in two ways: using an overlay, or printing directly onto the form. The other forms can be printed as the 1040 forms or you can use the computer generated forms printing. You can either do individual return printing or you can do a batch printing of up to 40 clients.

After you've prepared and printed the tax forms, you need to be paid. *The 1040 Solution* allows you to prepare client transmittal letters which will also print the tax due or tax refund amounts in the letter body. Estimated tax payments can be similarly handled. The text of each letter can be constructed from paragraphs in your library. To accompany the letters, there is the invoice, also automatically prepared from the data entered for each tax form used or upon some other standard rate.

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Creative Solutions also produces integrated state tax returns for Arkansas, Illinois, Indiana, Michigan, New York, North Carolina and Oklahoma. Outside developers can supply other state programs. These state return packages use the information entered in *The 1040 Solution* system.

As with any major piece of software, the real savings comes in the amount of support you receive from the vendor. Creative Solutions publishes on a regular basis, *The Balance Sheet*, which supports the user with aids, some promotional material, notices of new software delivery dates and a list of users. Once a year there is a user conference presented to interested users. For the price of *The 1040 Solution*, you also get a guaranteed renewal rate and three hours of consultation. After three hours, you will be billed $40 per hour. During a phone conversation concerning the use of *The 1040 Solution*, Creative Solutions, Inc. was extremely knowledgeable and helpful in solving several minor problems I created.

If you are interested in a professional tax preparation system, then I recommend that you seriously consider *The 1040 Solution* for its ease of use and excellent support.

(Creative Solutions, Inc., 230 Collingwood, Suite 250, Ann Arbor, MI 48103. 313-995-8811. $1495 for the 1985 version, ¾ cost of 1985 version for 1986 renewal.)

— Vincent Lord

Software 100

Interactive Solutions — Database, Word Processing and Spreadsheets in ROM

Nothing is so characteristic of the Model 100 as ROM software. This ever-present program magic is the secret of the portable's success. The promise of future wonders in plug-in ROM made the Model 100 an attractive machine from the beginning. Unfortunately, the secret of additional ROMs remained hidden for far too long.

Interactive Solutions is Tandy's latest entry in snap-in ROM software. The main virtue of *Interactive Solutions* and all ROM software is that it is fast and does not use any precious memory.

Interactive Solutions consists of three components: Data Manager, Data Calc and Word Processor. Data Manager is a screen-oriented filing system. Data Calc has spreadsheet-like calculation ability and Word Processor is a versatile text formatter with a door to the built-in Text program and mail merge capabilities. The whole is truly greater than its parts because each module can "interact" with the others.

The documentation supplied with *Interactive Solutions* is good. Tandy has once again provided both an 82-page manual and a pocket-size "Quick Reference" guide. The manual is more than adequate and includes sample data to step through some simple exercises. Disk/Video Interface users take note: The manual also indicates "*Interactive Solutions* is not meant to be used on the Disk/Video Interface."

Installation is literally a snap — snap off the rear compartment door and snap in the ROM module. You do need to exercise some care in handling the ROM module, however, because it is sensitive to static electricity.

To use *Interactive Solutions*, you first enter a two line BASIC program. From then on, running the program is a matter of pointing at the BASIC program INTSOL on the main menu and pressing ENTER.

Once you start the program, you are presented with the opening menu selection of the three programs and one of the finest user interfaces around. Menus include the list of function keys on the bottom line of the LCD. To choose a menu item, you can either press a function key or type the first letter of the item name. *Interactive Solutions* combines the Model 100's use of function keys with the commonly-used "first initial selection" to make menus comfortable to all.

Data Manager lets you "paint" a format on the screen to assign field names, lengths and characteristics of your database. Once defined, you can begin making entries into your new file. The total form size is not limited to the Model 100's screen size, but can be up to 20 lines long and up to 254 characters. The total number of labels and fields possible is 20, with each label having 16 or fewer characters. The layout for each file is stored separately as a special text file which, as the manual cautions, should only be changed using *Interactive Solutions*.

If you do have to change the record layout, you may be in trouble. When modifying a layout, you cannot add or delete a field, change the length of any field, change the order of fields, change the placement of the decimal point, or even change the length of a "comment" label such as the form name. So if the final field of the final record is one character short, you will have to start over and redesign the form and re-enter all the data records.

Entering information is a simple matter of filling in the blanks. Better yet, this same blank layout form is used again and again for locating specific records, designing printed reports and even transferring selected information from the Data section to the Word or Calc sections. Updating entries is a matter of locating the record and making any necessary changes. Data offers flexible search abilities to make locating records a simple process.

The items in a file can be printed in any order and selected based on whatever criteria you choose. The maximum width of a report is a disappointing 80 characters or nine columns. This is particularly frustrating since even standard-width dot-matrix printers can produce 132 characters in condensed mode. Reports can be sorted on a single field in either ascending or descending order.

If you don't have a printer handy or if you want to integrate your report into a Word document, *Interactive Solutions* features a unique ability to copy the report into the Model 100 "paste" buffer. Once the report is in the paste buffer, simply edit any document, position the cursor where you want the report and press PASTE. But a word of caution — if you exit *Interactive Solutions*, the paste buffer is cleared. Make sure you paste your report before returning to the 100's menu.

There are times when you need to return to the main menu. Unlike many programs which prompt you for filenames and supply you with a display of all files, *Interactive Solutions* does not offer any means of checking filenames. So if you forget a name, as I often do, you'll be checking back with the menu and losing the paste buffer.

Moving information from Data onto the Calc sheet is even nicer. All the

selection is done after entering Data Calc. Requesting a load from a Data file brings up the same layout form with all the same rules for choosing the records and fields to be incorporated in the worksheet. The fields are retrieved in the order specified, one record to a row.

Data Calc is a respectable size spreadsheet with 99 rows by 99 columns. It incorporates all the basic math operators as well as a variety of built-in statistical and trigonometric functions. Like all computer spreadsheets, Calc allows you to locate the text labels and numbers on the grid exactly as you would on paper. If you start an entry with a letter, Calc assumes a label; start with a number or a plus (+) or minus (–) sign and Calc assumes a number is being entered. The distinction is important not only for how the entry is aligned in the cell, (left or right) but also for how the entry is treated by formulas.

Formulas are the heart of the spreadsheet. They make minor or major changes simple. Calc uses column or row formulas. Once you enter a formula anywhere in a column or row, the formula is in effect for the *entire* row or column. If you have used a spreadsheet like *Lotus 1-2-3*, that's quite a switch.

Besides the unique situation with formulas, there are a few notable features missing from Calc. There is no way to move information from one part of the sheet to another. It is possible to insert rows or columns, but this does not address all needs. Also missing is a quick way to move the cell pointer from one location to another. This can be a real nuisance if worksheets grow.

Printing a spreadsheet is a simple matter of indicating what you want printed. You cannot send printer codes from Calc, however, so if you want to use condensed print, you must set up your printer from BASIC first or paste the spreadsheet to the Word section (if you have enough memory). As with the Data section, any information on a Calc sheet can also be included in a Word document by using the paste buffer to transfer it.

The Word Processor is the final component. Choosing Word from the *Interactive Solutions* menu leads you to another choice. Word allows an exit to the Text program for creating and editing documents. There is also a selection for building a print "control" file of formatting choices. Merging text with information from a Data file is the third menu option and printing is the final option.

Word is one of the many answers to the need for a companion to Text offering more sophisticated print formatting. The formatting capabilities of Word are fairly complete. You can build a control file for any document to set margins, page length, justifiction and line spacing. With "dot commands" in the document, you can also override any of the settings in the control file either temporarily or for the remainder of the document. Word also handles headers and footers, but each is limited to a single line.

As mentioned, you can paste information from either the Data or Calc sections into your documents. Word has a further connection to Data with the "mail-merge" feature. After creating a document with field names from a Data file, you can choose the merge option and select the records to be merged from the familiar layout screen. Word does the rest!

Special printer codes are often a problem. No matter how many printers a program supports, yours is usually not one of them. *Interactive Solutions* has a very simple solution to this dilemma.

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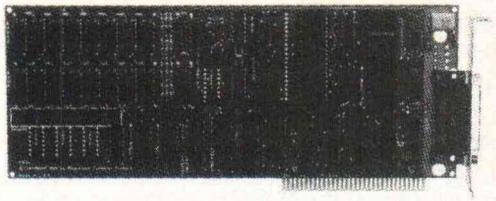

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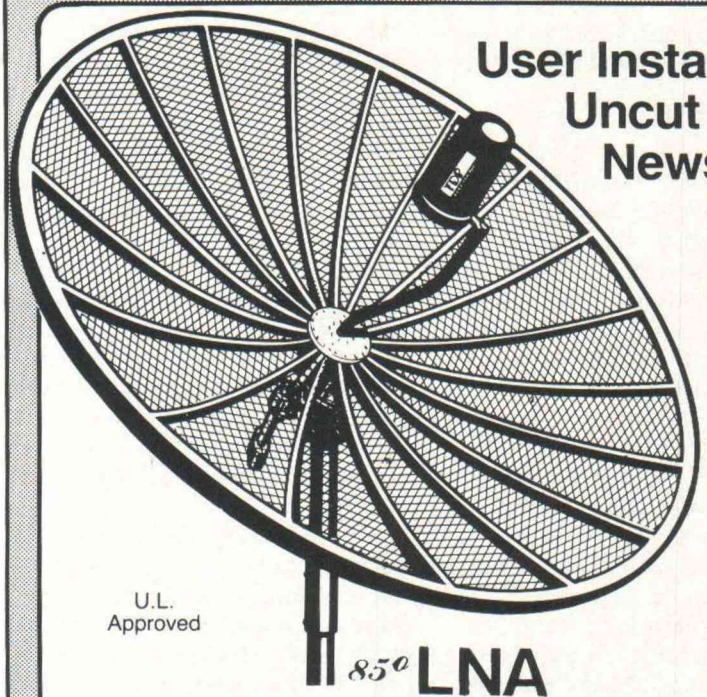

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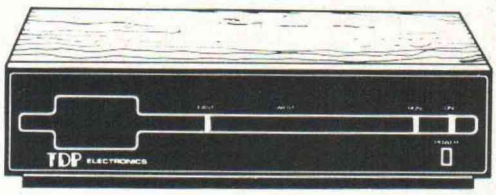

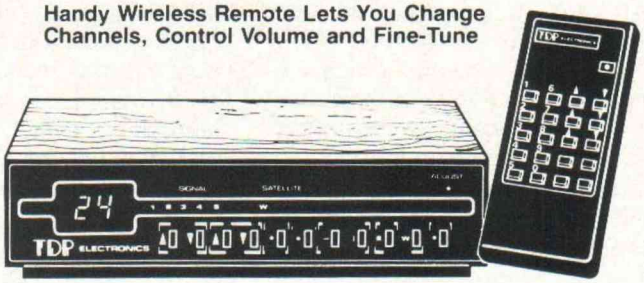

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A PRT.DO file, which you can customize, establishes all special printer functions such as underlining, condensed print and bold, and it allows you to give each one a single-letter name. That way, no matter what your printer, *Interactive Solutions* can take advantage of its special print functions. My only complaint is that special print controls do not work in headers and footers. The manual neither mentions nor explains this omission.

Probably the most useful feature that Word lacks is some form of on-screen print preview. The only way to check such items as line ends, page ends and overall appearance is to print the document. And you will need to check page ends since Word does not correct for one line "widows" and "orphans" at the bottom and top of pages, respectively.

If your primary needs are for data tracking and print formatting, with some light spreadsheet work, *Interactive Solutions* may be just the ROM for you. It's fast and it leaves all your precious RAM for data storage. Like all integrated programs, *Interactive Solutions* offers a common interface and good information sharing among the applications. Also, like most integrated software, it sacrifices some important functions — particularly in Data Calc. Fortunately, while individual modules may be lacking, they add up to the secret of ROM.

(*Interactive Solutions* distributed by Radio Shack, Cat. No. 26-3844, supplied on plug-in ROM, requires 16K, $149.95)

Software 1000/1200/3000

20th Century Shoebox — A Catch-All Filing System

What do you do with a shoebox? Stuff it with baseball cards, marbles, strange-looking pennies, lucky stones, and then, later in life, the more mundane coupons, bills or receipts. This is the "entry-first accounting" premise of *Twentieth Century Shoebox*, a personal finance manager written in *Turbo* PASCAL from Levins Engineering.

The idea is to throw information into your "shoeboxes," (files) and worry about organizing them later. No knowledge of accounting is necessary, and in less than an hour, you should be familiar enough with the material to start working.

The non-protected disk contains two sample files and a one-page tutorial. The latter is probably insufficient for most users, but the excellent, context-sensitive, on-line help screens more than make up for this weakness. Also included are directions for starting four files — Tax Records, Coupon Organizer, Travel Expenses and Computer Use Log.

You are always in one of four modes: Enter (to enter new information); Browse (to look through and/or edit existing entries); Report (to write to either screen or printer either full or partial reports); and System (to return to DOS, change to color or B/W mode and to choose to work on either a new or existing file). These four options are displayed at the bottom of the screen, and moving from one to another is a simple, one-key operation. Also displayed are the current file, available functions and the last entry.

Perhaps a description of a file I created would best outline the procedures. I first chose the name "Hobbies" in System mode to start a new shoebox, then pressed ESC to go to Enter mode. Immediately, I was prompted for the data and amount (limited to four digits plus two decimal places) of the first entry. For the prompt "Notes" (limited to 10 characters or less) I entered "Hardware," for "Tag" (limited to 18 characters or less) "Radio Shack," and for "Category," (limited to 11 characters or less) "Computer." For my second record, after the date and amount, I entered "Jazz CD," "Ernie's Emporium" and "Music." For the third, I typed "Literature," "Walden's" and "Books." For the fourth entry, I used "Software V" ("V" for VISA) and "Radio Shack." Since I had the "Tag-Matching" option on, the category "Computer" was automatically chosen by the program.

That's it! Just keep adding records, making any changes or modifications you wish at any time. Note the extreme flexibility of the program, as well as the use of multiple notes. No formal structuring is required prior to beginning a file, although, as in most programs, the more thought given to set-up, the more streamlined the file.

By now moving into Report mode, it is possible to print to screen or printer either a full or partial report. I can search, for example, for all entries containing "VISA" or "Jazz" or both. Other logical operators are not supported.

The software lends itself readily to files not usually associated with accounting. For instance, one of the suggested shoeboxes is "Coupon Organizer," with major categories such as "Cereals" and "Beverages," specific brands as the tags and the expiration date of the coupon as the date. The running total would be the value of all the coupons.

My wife immediately thought of starting a file for the high school yearbook she sponsors, using fund raising activities as the major categories and student names and methods of billings as some of the possible tags. My son experimented with tracking his extensive book and comic collection.

Though certainly not suitable for business accounting, *Shoebox* is worthy of consideration as a personal accounting system, especially for the price. The only real complaint I had involved the rather untidy screen displays. A call to Levins, however, assured me that this problem had been resolved in newer packages.

In conclusion, *Twentieth Century Shoebox* is an easily-mastered program which functions quickly and smoothly. While not intended for formal accounting, it would surely help in organizing a variety of personal information.

(Levins Engineering, Inc., 1802 Greenwich Woods Drive, Silver Springs, MD 20903, 301-564-8333, $29.95 plus $3 S/H.)

— Pat Pugliano

Software 1000/1200/2000/3000

Super Utility Helps Recover Lost Data

Now you see it — now you don't! Fun if you're at a magic show but not so much fun if you just lost your software review for PCM or my other favorite magazine, *The Rainbow*. I sure need some super help now. Why not *Super Utility* by PowerSOFT.

Yes, your favorite Tandy Model I, III and IV utility is now available for the Tandy 1000, 1200, 2000 and 3000 and other IBM compatible computers. This is not *Super Utility Plus* ported over to IBM compatible machines; it is a completely new program. I have seen *Super Utility Plus* and believe me, PowerSOFT knows how to write utilities. *Super Utility*, called *SU* from here on, is meant primarily as a file recovery and disk media utility. It does not have features such as creating non-standard tracks in memory and then placing them on disks to copy protect them. You can, however, modify sector data and write it back to disk.

SU comes packaged in a nice vinyl 6 by 8½ inch portfolio. One inside pocket contains the disk and registration card while the other contains a 31-page manual. I found only one mistake in the manual and that was on Page 13 in the section "Sector Modification." The sample screen used is that of a "sector verify" not modify. No problem however, since these two screens are basically identical except for the "from" and "to" sector input required to verify a sector range.

SU works on fixed disks and cartridge systems such as the Iomega Bernoulli Box or Tandy Disk Cartridge System as well as floppy disks. An install routine is included for those who might have certain other fixed disk configurations. Those included are Great Lakes Computer Peripherals, Mercury Megabank Hard Disk and Pegasus Hard Disk. *SU* may be displayed on a color or monochrome monitor. The manual states that if any screens look unusual (missing backgrounds), remove any `ANSI.SYS` files you might have in your `CONFIG.SYS` file and reboot the system.

"This is not *Super Utility Plus* ported over to IBM compatible machines; it is a completely new program."

As the copyright and title screen appear, a message at the bottom of the screen instructs you to press ESC if the display is not readable. This usually occurs with a monochrome monitor on a system with a color card in it. Pressing ESC as instructed solved the problem.

Before the main menu appears, *SU* displays the message "please wait, analyzing system volumes." The main menu then displays either six or seven options based on what type disk drives are found on the system. With no fixed disks on the system, there are six options, the sixth being "Quit." With a fixed disk attached, Option 6 becomes "Custom Volume Configuration" and "Quit" becomes Option 7. The remaining options are Disk Maps, Sector Modify, Directory and File Changes, Sector Copy and Sector Verify.

Choosing "Disk Maps" will present you with a sub-menu which is again dependent upon your system configuration. The options are Volume Dimension Graphic, DOS Volume Information Maps, Fixed Disk DOS Information Map, Fixed Disk DOS Partition Graphic and Return to Menu.

I tried using *SU* on four different machines with four different drive configurations. The first, of course, was

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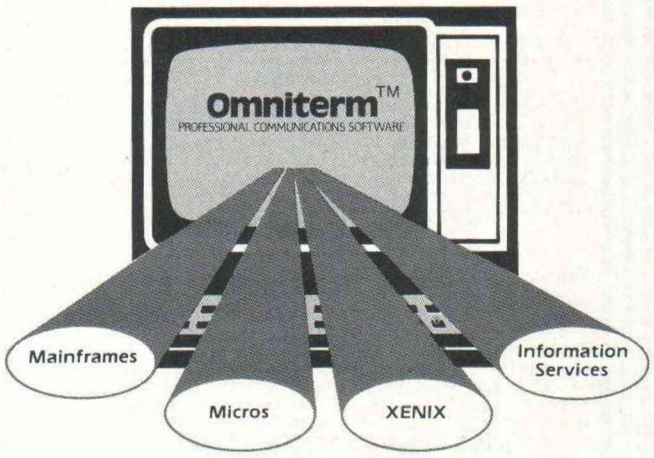

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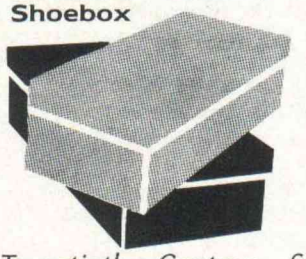

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. . .it would surely help in organizing a variety of personal information. — *PCM, March '86*

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Requires Tandy 1000, IBM PC, or true compatible with at least one disk drive, 128K RAM and DOS 1.0 or higher. Color Monitor and printer supported but not required.

my trusty Tandy 1000 with two floppy drives and a RAM drive installed. The second was an IBM PC with a 20-meg Bernoulli Box and two floppies. The third was an IBM PC-AT with two floppies and a 20-meg internal fixed disk. The fourth was a Tandy 1200 with one floppy and a 10-meg internal fixed disk.

The Tandy 1000 configuration displayed as three floppy drives, the IBM PC as two internal floppy drives and two external floppy drives, the IBM PC-AT as two floppies and an internal fixed disk, and the Tandy 1200 as a single floppy (designated as 1 instead of A) and one internal fixed disk.

When using the PC-AT and the Tandy 1200, the Custom Volume Configuration option never appeared on the main menu. Also, options 3 and 4 of the Disk Maps sub-menu did not appear while using the PC-AT but they were available when I tried using the Tandy 1200. I do not know if the DOS FDISK routine had been run on the PC-AT. A single DOS partition appeared to exist on the Tandy 1200.

The Volume Division Graphic option displays the device name, type, number of DOS volumes, total storage for all volumes of this type and a bar graph representing percent full for the first volume. Pressing the space bar displays each successive volume.

The DOS Volume Information Map gives the same data plus 12 detailed features such as total data sectors, bytes per cluster, number of FATs, logical unit number and several others. Here you may use the arrow keys to change between Drives A and B. Pressing the space bar brings up the next two volumes. A RAM drive displays exactly like a physical drive.

Option 3 displays like Option 1 but without the graphics. In addition, each partition is displayed with its start and end sectors, size in megabytes, percent used and status (active/non-active). Option 4, DOS Partition Graphic, displays total sectors, number in use, number available and the bar graph. Option 5 returns you to the main menu.

Selecting option 2, Sector Modify, displays all active volumes and asks with which one you wish to work. Then a menu is displayed along the bottom of the screen which allows you to find, change, next, last, repeat, search and quit — simply type the first letter.

"Find" requests a sector number to locate, while "Search" prompts you for an ASCII string. Characters outside the ASCII range may be entered by using the ALT key and decimal number from the keypad. The search begins from the first data sector, or the last sector found using the find command, and continues through the last sector on the disk. Press any key and the search will be terminated. A list of all sectors and the relative position within the sector where the string is found is then displayed.

"Next" and "Last" step forward and back through the sectors, while "Repeat" followed by "Next" or "Last" will continuously step through sectors until you press a key.

"Change" allows you to alter a sector and save it back to disk. You may change data either in Hex or ASCII mode by toggling with the F5 key. All 512 bytes of the sector are displayed at one time.

"Directory and File Changes" also requests a volume to work with and then displays all files and subdirectories on the chosen volume. Displayed are the type (file or sub-

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directory), filename, time, date, size, FAT-entry, hide, R/O (read only) and system along with the volume name if one is present.

You may change the filename, volume name, hidden, read only and system attributes if you wish.

The arrow keys are used to select a file or sub-directory. The F1 key will then display the FAT for the selected file; F2 will display the FAT for the entire volume; F3 will enter the sector modify mode displaying the first sector of the file; and page-up and page-down will move between the root directory and the selected level of sub-directory.

File restoration is done from this option. Deleted files display with their file type flashing and the first character of their filename missing. For some reason the file type did not flash when using the Tandy 1200, however the first character of the filename was missing. Entering the first character of the filename places you in the restore mode. Everything known about the file is displayed, even down to a guess as to whether the file was ASCII or non-ASCII. The first sector of the first possible cluster is placed on the screen for you to examine. You may press ENTER to restore, use PG UP or PG DN to examine other sectors in the cluster or use ESC to cancel the restoration process.

When in the auto-select mode the next possible cluster of the proper type (ASCII or non-ASCII) will be displayed if you choose to restore. Turn auto-select off with the F4 key and you may examine all available clusters regardless of type. You may choose the clusters to restore. The number of clusters restored and the number still required is displayed. If all clusters cannot be restored, you may use the /F option of CHKDSK to adjust the file size in the directory and the FAT. This is primarily for use on ASCII files.

If the first cluster has already been used, *SU* will display a message of sympathy and suggest using the search function and Option 4, Sector Copy. This option will copy sectors to a file. It prompts for an output filename, and if one is not specified, it defaults to COPY*nnnn*.CHK just as the CHKDSK command in DOS. Next specify an output volume and finally the volume and sectors to copy. You may be able to recover portions of a file using this method.

Option 5, Sector Verify, simply requests a volume and the range of sectors to verify. Errors are indicated by a beep and the sector number will be displayed.

I could not test Custom Volume Configuration for two reasons. First, it did not appear as an option on any machine I used and second, a warning in the manual states that this option will delete every entry on that volume.

Overall, *Super Utility* performs very well. It is very simple to use and completely menu oriented. As advertised, it does not take a programmer to use. Most terms are defined in a glossary but the numbers displayed on a volume or file FAT take some understanding of disk and file structures. Even without this understanding though, file restoration is made quite simple, as long as the file has not been written over, with step-by-step instructions. *Super Utility* is an excellent package. Lose a few days work and judge for yourself.

(PowerSOFT, 17060 Dallas Parkway, Suite 114, Dallas, TX 75248, $89.95)

— Larry Birkenfeld

BARBAROSSA

The War in Russia 1941-44

ARK ROYAL'S most popular Color Computer wargame is now available on the Tandy 1000 and all IBM compatibles. Hi-res graphics, 100% ML, Barbarossa is the same game raved about in the RAINBOW and HOT COCO (Jan '86), except that the 1000's memory allows room for a host of expanded features. Included are bitmapped logical characters (tanks, infantry, airflottes, cities and terrain), normal and Bliltskrieg movement, airstrikes, supply consideration, unit detail, group transfer, weather, intelligence, (which even tells you which sector your attacking unit is in), patrols, game save and even more. $24.95, disk. We pay shipping and handling on all prepaid orders in USA. COD charge is $2.50. Personal checks in US accepted with no shipping delays. Foreign orders send M.O. in US funds. FL residents add 5% sales tax.

Program requires disk, graphics card, 128K.

P. O. Box 14806
Jacksonville, FL 32238
(904) 786-8603

Clipper Compiles *dBase III* Programs

As a long-time advocate of *dBase II* and *dBase III* as a professional software development tool, I was very happy to hear about Nantucket's *Clipper*, a *dBase III* program compiler. If what the advertising claimed was factual, programs written with *dBase III*, when compiled with *Clipper*, would run two to 20 times faster than when run using the *dBase III* interpreter.

Much to my surprise, the advertising *was* honest. While most procedures didn't run 20 times faster, a speed increase of 300 percent (three times faster) was not uncommon. I was sold.

What does *Clipper* do?

In addition to allowing the user to enter commands from the keyboard and execute them at that moment, *dBase III* allows more sophisticated users or programmers to put together many commands into "procedure" (program) files which may then be executed by entering a single command. This automates *dBase* so it can perform complicated tasks without the end-user entering a single *dBase* command or even *knowing* anything about *dBase*.

When you are running a *dBase III* program, *dBase* reads the procedure file one line at a time and "intreprets" the commands. That is, it converts each command into instructions that the microprocessor in the computer can understand. Even though this is done at very high speeds, the time it takes to intrepret each single command in a *dBase* procedure file each time the user runs the program adds up significantly.

Clipper is a *dBase III* compiler. A compiler is a program that takes high-level programs (those that are close to English, such as *dBase III*) and converts them into a language that the computer's microprocessor can understand without interpretation. The result is, since the "compiled" programs don't have to be intrepreted for the microprocessor each time they are run, they will execute much faster.

Another benefit of this is that the compiled programs can be run without *dBase III* or *Clipper*. That is, they are stand-alone machine language programs. While it is beneficial to have *dBase III* when developing the programs, the compiled *dBase III* programs may be distributed without *dBase III* itself. This can amount to a big savings if the compiled programs are to be run on more than one machine.

Compatibility

Clipper will compile just about any *dBase III* program on the first try. The only problems I experienced when using *Clipper* were with certain "macros" and the compilers adversion to using dashes (-) in filenames.

Clipper adds some very useful commands and features to *dBase III*. Among these are the much-needed `INKEY( )` function; a `VALID` clause for `GET` statements to check for proper user input; multi-child relations with `SET RELATION TO`; a real-time debugger which lets the programmer set breakpoints, check variables and fields, single-step programs and enter new values for variables while the program is running; extended support of the programmable function keys; in-memory screen swapping; and a very nice method for defining your own string and math functions. This is just to name a *few*!

The only problem with using the new commands provided by *Clipper* is, since *dBase III* does not support these new commands, your program will no longer run un-compiled using *dBase III*. In other words, you'll be unable to test programs with the *dBase III* interpreter before going through the time-consuming process of compiling. I found this a fair trade since the new *Clipper* commands reduced programming time and allowed me to add features to my programs that I was unable to offer using straight *dBase III*.

Clipper has its own, more-efficient indexing system which is incompatible with *dBase III* indexes. Therefore, it is neccesary to build all index files from within a *Clipper*-compiled program. To keep things from getting too confusing, *Clipper* uses the extension `.NTX` for its index files, while *dBase III* uses `.NDX`.

The documentation states that, while the *Clipper* compiler might not run on non-IBM compatible machines, the programs it compiles can be made to run on just about any MS-DOS machine that supports ANSI terminal commands. When I tried compiling and linking the programs using the supplied

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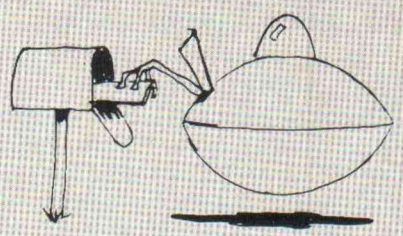

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ANSI driver, they wouldn't run correctly on any machine I tried — even the compatibles. Thus, as it stands, *Clipper*-compiled programs will not run on a Tandy 2000, but will run on a 1000, 1200 or 3000.

How it Works

Compiling *dBase III* programs with *Clipper* is a two-step process. The first step is to compile the program. This looks at the program code and decides what needs to be done to convert it to machine language. The next step is to link it. Linking puts together the neccesary machine language routines to make a complete machine language program.

If your program uses DO or SET PROCEDURE TO commands to call other files, *Clipper* will automatically include these files in the compiled program. In other words, if you have a program system that includes a dozen programs, the end result will be a single machine language program.

A typical *dBase III* program will be about 130K when compiled. This number is not much higher or lower with larger and smaller source programs since the necesary machine language routines which are linked together during the linking process are not duplicated in the final compiled program.

If your application is too large to fit into the computer's memory when compiled, the linker supplied with *Clipper* allows you to split up the program into overlay files which are loaded from the disk when needed as the program runs.

If your program encounters an error while running, the actual line number of the source program is displayed along with some information about the nature of the error. This sort of error reporting is a *significant* plus for program development and is rare to find in compilers.

Documentation

The *Clipper* manual we received for review was about half typeset pages and half computer-generated addendums. There was very little information on using the new commands and features or on using the linker. Most of what I learned about it was by using the manual as inspiration for experimenting. Perhaps the final version of the manual will be more concise.

Copy Protection

The *Clipper* compiler is supplied on a single copy-protected disk. Another, non-copy-protected disk contains the specilized *PLINK86* linker program. *Clipper* will not run directly from the distribution diskette, but must be installed on another floppy disk or a hard disk drive to work. A little more generous than most software vendors, Nantucket allows you to have up to four copies of *Clipper* installed on different disks. It also provides a "de-install" program for safely moving *Clipper* from one disk to another.

It is important to remember, though, that programs compiled with *Clipper* do not need either *Clipper* or *dBase III* to run, and Nantucket does not put any restrictions on the distribution of software compiled with *Clipper*. Therefore, *Clipper* can be used to develop programs that are to be run on many machines or even to be distributed commercially.

Conclusions

Clipper is not for the casual *dBase III* user or the person who uses *dBase III* strictly on a command-level basis. But for the serious *dBase III* programmer, *Clipper* is a godsend. It makes programs run much faster, adds many useful programming and debugging features and frees our programs from *dBase III*. In fact, it is one of the nicest compilers I've used on a microcomputer for any language.

(Nantucket, 5995 S. Sepulveda Blvd., Culver City, CA 90230, 213-390-7923, $695.)

— Danny Humphress

Hardware **1000/1200**

Supercharge your Tandy with MFB-1000 multi-function board

When the Tandy 1000 was introduced a little more than a year ago, I found only one major problem with the machine's design. That was the lack of ample expansion slots. You could not, for instance, have a 640K Tandy 1000 with both a modem and a clock/mouse — there wasn't enough room for all the cards. Instead, you would have to live without one of the functions, be content

to swap boards in and out, or look elsewhere for a computer.

On the IBM PC, this problem was quickly tackled by third party suppliers who designed "multi-function" boards — expansion cards that combine more than one feature and occupy a single slot in the computer. But these cards are usually too long to fit in the Tandy 1000's case and they used a memory addressing technique different from Tandy's. Would any of these manufacturers produce similar products for our favorite Tandy machine?

That day is here. PBJ, a long-time third-party supplier for Tandy-compatible products, has come to the rescue. Their MFB-1000 multi-function board combines the features of four boards (two 128K memory boards, RS-232 interface and clock) into one single card. The MFB-1000 comes with 128K memory (expandable to 512K), an RS-232C serial communications interface and a clock/calendar with battery backup.

In addition to working with the Tandy 1000, the MFB-1000 is also compatible with the Tandy 1200 and IBM PC. Instructions provided with the board tell you how to change a jumper to make the memory addressing compatible with these machines.

One of the convenience features of the MFB-1000 is its built-in clock/calendar with battery backup. You simply install a supplied device driver on your diskette's `CONFIG.SYS` file (detailed instructions are provided), and your computer will automatically know the correct date and time when it boots.

"the MFB-1000 is also compatible with the Tandy 1200 and IBM PC."

Installation of the MFB-1000 is simply a matter of removing two screws on the front of your Tandy 1000, lifting off the cover, inserting the card in an available slot and replacing the cover. If you install more memory chips on the board, the instructions help you along and tell you which jumpers you need to change.

The basic MFB-1000 comes with two banks of 64K chips for a total expansion of 128K (added to the built-in 128K in the Tandy 1000). These chips may be replaced with the newer 256K chips for 256K or 512K on the board. The 64K and 256K chips cannot be mixed on the board, however. In other words, if you are using 256K chips in one bank, the other bank must be empty or be filled with 256K chips.

The RS-232C serial communications adapter is pre-configured as COM1 and cannot be changed. If you are using another communications device, it must be changed to COM2 to prevent interference with the MFB-1000 board.

PBJ has done a fine job on this board. The installation was quick and simple. In a matter of minutes, my machine went from a plain 128K Tandy 1000 to a supercharged 640K machine with communications and an automated ticker.

(PBJ, Inc., 503 East 40th Street, Patterson, NJ 07504, (201) 523-8663, $359.95)

— Danny Humphress

Submitting Material To PCM

Contributions to PCM are welcome from everyone. We like to run a variety of programs that will be useful/helpful/fun for other Tandy Portable and MS-DOS computer owners. We now support the Tandy portable models 100, 200 and 600 and the Tandy 1000, 1200, 2000 and 3000 MS-DOS computers.

Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

Pay for submissions is based on a number of criteria. The rate of remuneration will be established and agreed upon prior to publication.

For the benefit of those who wish more detailed information on making submissions, please send an SASE to: Submissions Editor, PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

If you feel qualified to review software and/or hardware products for computers covered in PCM, send us your name, address and phone number; we will send you a questionnaire form and a copy of our reviewer guidelines.

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The following products recently have been received by PCM, examined by our magazine staff and approved for the PCM *Seal of Certification*, your assurance that we have seen the product and have ascertained that is what it purports to be. This month the *Seal of Certification* has been issued to:

1-Hour Telecomputing, a crash course in on-line computer communications. Discusses technical terms and features of available communications packages and computer services. *IMPRESS, 1412 Rosewood, Ann Arbor, MI 48104, (313)761-2231, $19.95.*

The Computer Underground, a book by M. Harry on computer hacking, crashing, pirating and phreaking. Discusses terminology and security measures for protecting computer systems and data. *Loompanics Unlimited, P.O. Box 1197, Port Townsend, WA 98368, $14.95.*

Connections: Telecommunicating on a Budget, a book by Robert Chapman Wood for people new to computer communications. Discusses communications software and computer information networks. *Scott, Foresman and Company, Professional Publishing Group, 1900 East Lake Avenue, Glenview, IL 60025, $15.95.*

Cross Reference Facility, a software development tool for BASIC programmers which will list report references to program variables. Requires Tandy 1000, 2000, 1200 or 3000. Program listing supplied only. Disk available at extra cost. *Cheapware, Robert L. Nicolai, 4038 N. Ninth Street, St. Louis, MO 63147, (314) 621-7618, $9.95.*

DMP-2100 Custom Font System, allows you to create your own library of printer fonts or use a number of supplied fonts with Tandy's DMP-2100P printer. Requires Tandy 1000, 1200, 2000 or 3000 and a DMP-2100 printer. Tandy, distributed through Radio Shack stores nationwide, Catalog No. 25-1158, $24.95.

Electronic Envelope, a utility that allows you to prepare any computer file for distribution through electronic mail services. Converts binary files to ASCII for transmission and back to their original format after going through electronic mail. *MCTel, Three Bala Plaza East, Suite 505, Bala Cynwyd, PA 19004, (800)628-3584, $49.95.*

Key Entry III, a high speed data entry software package. Provides easy-to-learn data entry and validation, editing and record searching. *Southern Computer Systems, Inc, 2732 7th Avenue S., Birmingham, AL 35234, (205) 933-1659, $895., plus shipping.*

Kleen Line MPS(22)-4, protects your computer and modem from electrical and phone line power surges and general "line noise." Works with all Tandy AC-operated machines. *Electronic Specialists, Inc., 171 South Main Street, Box 389, Natick, MA 01760, (800) 225-4876, $201.95.*

Kleen Line PDS-11, protects your modem from phone line surges and noise. Works with all modems. *Electronic Specialists, Inc., 171 South Main Street, Box 389, Natick, MA 01760, (800)225-4876, $73.95.*

The Lens, a software package that allows an enlarged version of the monochrome display to be created on the color display. Requires Tandy 1200 or 3000 with both monochrome and color graphics displays and adapters. *ARTS Computer Products, Inc., 145 Tremont Street, Boston, MA 02111, (617) 482-8248, $495.*

Logic Line I, an aid to persons who wish to access and study as well as retrieve data from a large body of information or from textual material. Data can be retrieved independently of how it was input. Requires Tandy 1000, 1200 or 3000. *Clarity Software, P.O. Box 839 Chesterland, OH 44026, (216) 729-1132, $250.*

Mastercom, an easy-to-use smart terminal and file transfer utility program designed to be easy for beginners yet have the features for more experienced users. Requires Tandy 1000, 1200 or 3000. *The Software Store, 706 Chippewa Square, Marquette, MI 49855, (906) 228-7622, $49., plus shipping.*

PC Sweep, a disk and file management program which allows the user to easily perform routine disk and file maintenance such as deleting, renaming, copying and making backups. Requires Tandy 1000, 1200, 2000 or 3000. *Koch Software Industries, 11 West College Drive, Building G, Arlington Heights, IL 60004, (312) 398-5440, $79.95.*

Project Scheduler, aids in breaking down large jobs into individual tasks and keeping track of the project's progress. Requires Tandy 200. Tandy, distributed through Radio Shack stores nationwide, Catalog No. 26-3893, $39.95.

Text Power 200, a text formatter that enhances the usefulness of the Tandy 200's internal Text function. Requires Tandy 200. *Tandy, distributed through Radio Shack stores nationwide, Catalog No. 26-3881, $39.95.*

Timeslips, a time and expense tracking program with billing, reporting and graphics. Used to track and bill time-related costs and expenses for specific projects. *North Edge Software Corp., P.O. Box 286, Hamilton, MA, 01936, (617)468-7358, $99.95.*

X-TEL, an advanced communications program for the Tandy 100 or 200. Supports on-line text editing and XMODEM communications protocol. Requires Tandy 100 or 200. *Sigea Systems, Inc., 19 Pelham Road, Weston, MA 02193, (617) 647-1098, $50., plus $5 shipping.*

By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to PCM's reviewers for evaluation.

Using *BAREAD 2.1*

Bar code listings must be read in numerical order beginning with Line 1 and continuing through the last line of the listing. The computer display is used to prompt you as to which line to scan and give you warning messages should you happen to get out of step.

When you run *BAREAD*, it asks you to scan the first line of the bar code listing. This line contains the name of the program as well as the beginning of the program itself. The computer will sound a high-pitched beep whenever it's ready for you to scan a line. After a line has been successfully read, you'll hear a lower beep. A "blip-bloop" sound prompts you to turn your attention to the screen for a message. You'll hear this when you accidentally scan a line out of sequence.

After reading the first line, you continue scanning with the second line. Remember to wait for a high beep before scanning and then listen for a low beep to indicate a successful read.

Once the last line of the listing has been scanned, *BAREAD* will return control to the Tandy 100/200 menu screen. Note that the program you just scanned is now in the directory with a .DO extension.

The final step is to convert the .DO text file to a normal BASIC program. This is done quite simply by going to BASIC and loading the file with a command such as LOAD"TEST .DO" (if the program name were TEST). The program will load into BASIC and will be ready to run. To save the program in BASIC's compressed format (.BA extension), you'd type SAVE"TEST" (if the program were named TEST). You may then kill the .DO file with KILL "TEST.DO".

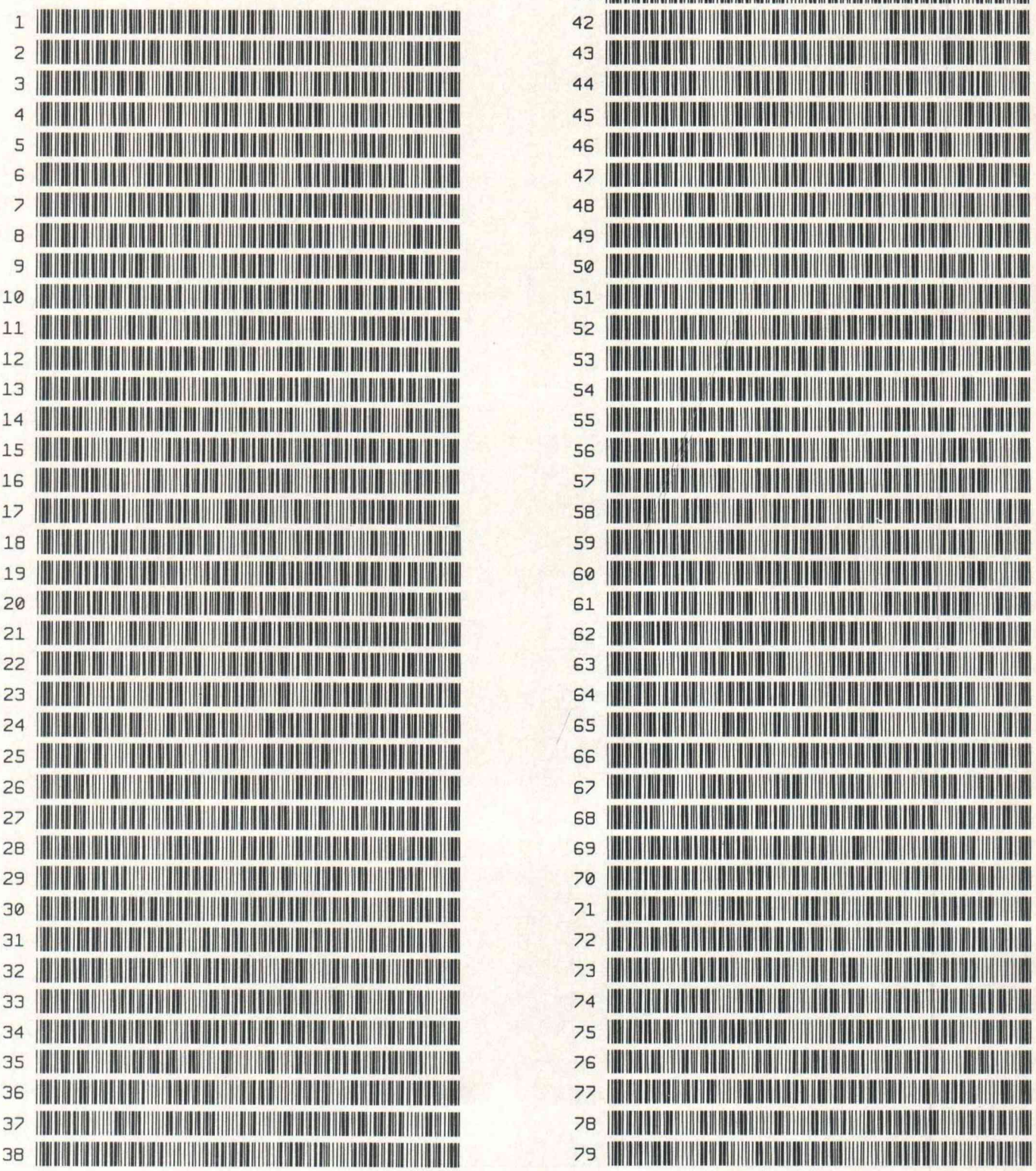
BAREAD 2.1

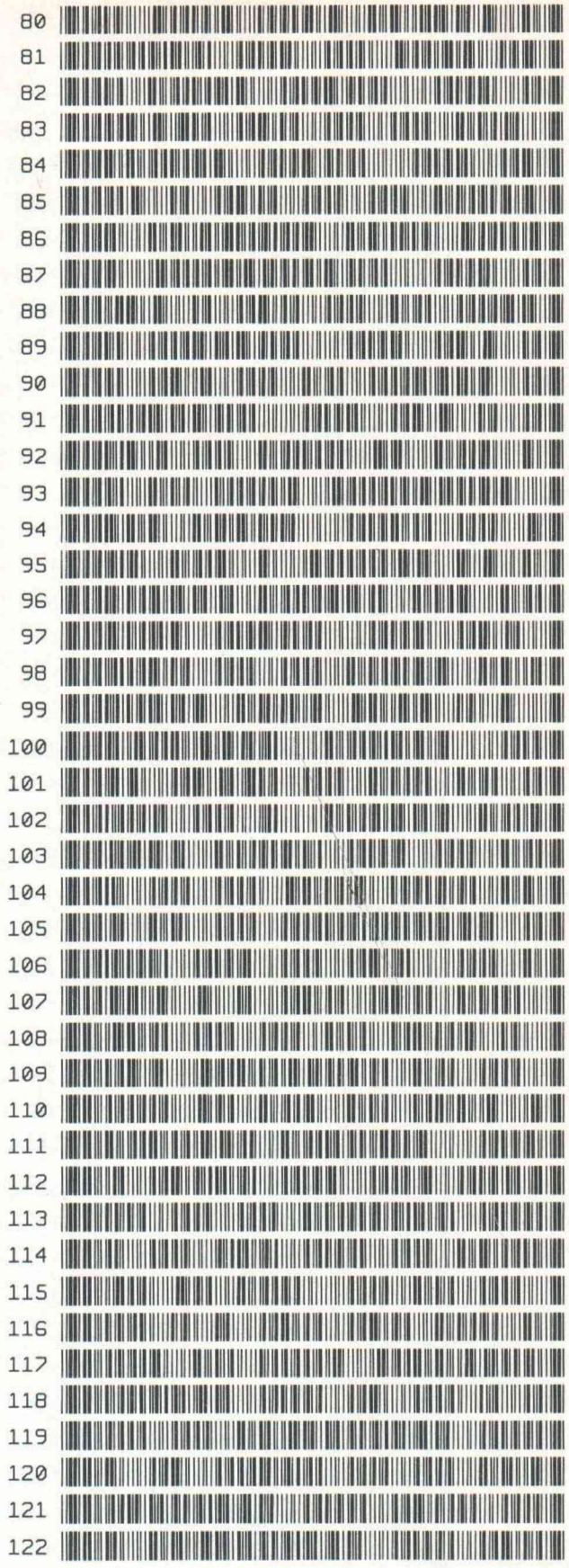
```
1ØØØ ' *** Initialize ***
1Ø1Ø ON ERROR GOTO 1Ø4Ø
1Ø2Ø CLEAR 1ØØØ:MAXFILES=2
1Ø3Ø GOTO 1Ø5Ø
1Ø4Ø IF ERR=5 THEN RESUME NEXT
1Ø5Ø ON ERROR GOTO Ø
1Ø6Ø RUNM "B3OF9"
1Ø7Ø OPEN "WAND:" FOR INPUT AS #1
1Ø8Ø UC%=-1
1Ø9Ø PC$="Ø123456789ABCDEFGHIJKLMNOPQRST
UVWXYZabcdefghijklmnopqrstuvwxyz- $+"
11ØØ DIM RW$(36)
111Ø ER$(1)="You must scan line 1 first!
"
112Ø ER$(2)="You've SKIPPED a line!"
113Ø ER$(3)="You've ALREADY SCANNED this
 line!"
114Ø ER$(4)="Code not PCM2/39 format!"
115Ø ER$(5)="Command not applicable here
!"
116Ø ER$(6)="You cannot skip this line!"
117Ø ER$(7)="Selected resume file not in
 computer!"
118Ø ' *** Read Reserved Words List ***
119Ø DATA BEEP,CLEAR,CLOSE,DATA,DEFDBL,D
EFINT,DEFNG,DEFSTR,ELSE,GOSUB,GOTO
12ØØ DATA INKEY$,INPUT,INSTR(,LCOPY,LEFT
$(,LINE(,LOADM,LPRINT,USING,MAXFILES
121Ø DATA MID$(,NEXT,PEEK,POKE,POWER,PRE
SET(,PRINT,READ,RESTORE,RETURN,RIGHT$(
122Ø DATA SOUND,SPACE$(,STRING$(,THEN
123Ø FOR I%=1 TO 36:READ RW$(I%):NEXT I%
124Ø ' *** Procedure Begins Here ***
125Ø CLS:PRINT@44,"PCM Bar Code Program
Reader v2.1"
126Ø LINE(2Ø,4)-(219,18),1,B:LINE(22,6)-
(217,16),1,B
```

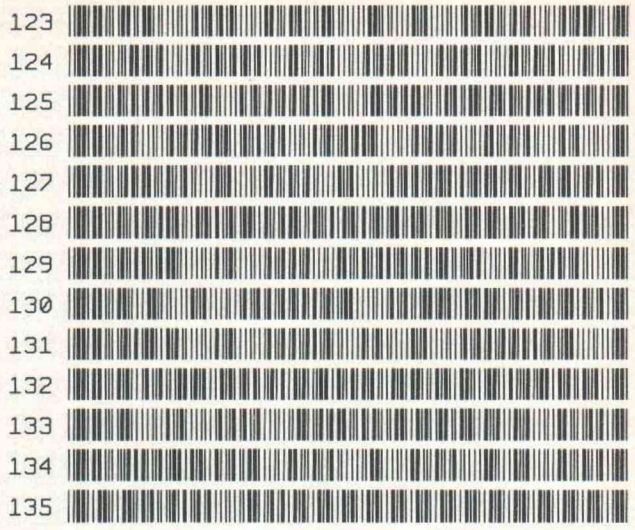
```
127Ø NN%=1
128Ø GOSUB 166Ø:IF ER%>Ø THEN GOSUB 162Ø
:GOTO 128Ø
129Ø IF LL%=Ø AND INSTR("YN",IL$)>Ø THEN
 ER%=5:GOSUB 162Ø:GOTO 128Ø
13ØØ IF LL%=Ø THEN ON INSTR("ALSR",IL$)
GOTO 182Ø,189Ø,198Ø,2Ø5Ø
131Ø IF LL%=1295 THEN 135Ø
132Ø IF LL%<>NN% AND NN%=1 THEN ER%=1:GO
SUB 162Ø:GOTO 128Ø
133Ø IF LL%<NN% THEN ER%=3:GOSUB 162Ø:GO
TO 128Ø
134Ø IF LL%>NN% AND NN%>1 THEN ER%=2:GOS
UB 162Ø:GOTO 128Ø
135Ø IL$=RIGHT$(IL$,19)
136Ø IF LL%=1 AND NN%>Ø THEN GOSUB 178Ø
137Ø CL$=CL$+IL$
138Ø FOR I%=1 TO LEN(CL$)
139Ø    CH$=MID$(CL$,I%,1)
14ØØ    IF CH$="%" THEN GOSUB 151Ø:IF NL
% THEN 147Ø ELSE GOTO 144Ø
141Ø    IF CH$="/" THEN GOSUB 155Ø:IF NL
% THEN 147Ø ELSE GOTO 144Ø
142Ø    IF CH$="." THEN UC%=NOT(UC%):GOT
O 145Ø
143Ø    IF CH$=>"A" AND CH$<="Z" AND NOT
(UC%) THEN CH$=CHR$(ASC(CH$)+32)
144Ø    XX$=XX$+CH$:IF RIGHT$(XX$,1)=CHR
$(13) THEN PRINT#2,XX$;:XX$="":UC%=-1
145Ø NEXT I%
146Ø CL$=""
147Ø PRINT@2ØØ,SPACE$(8Ø);
148Ø IF LL%<>1295 THEN NN%=LL%+1:GOTO 12
8Ø
149Ø ' *** Done ***
15ØØ CLOSE:CALL 618Ø7!:CLEAR 5ØØ,HIMEM:M
ENU
151Ø ' *** Decode Reserved Word ***
152Ø NL%=Ø:IF I%>LEN(CL$)-1 THEN NL%=-1:
CL$="%":GOTO 154Ø
153Ø I%=I%+1:CH$=RW$(INSTR(PC$,MID$(CL$,
I%,1)))
154Ø RETURN
155Ø ' *** Decode Hex and Control Charac
ters ***
156Ø NL%=Ø:IF I%>LEN(CL$)-1 THEN NL%=-1:
CL$="/":GOTO 161Ø
157Ø I%=I%+1:IF INSTR("/%.",MID$(CL$,I%,
1))>Ø THEN CH$=MID$(CL$,I%,1):GOTO 161Ø
158Ø IF I%>LEN(CL$)-1 THEN NL%=-1:CL$=RI
GHT$(CL$,2):GOTO 161Ø
159Ø HX$=MID$(CL$,I%,2):CH$=CHR$((INSTR(
"Ø123456789ABCDEF",LEFT$(HX$,1))-1)*16+I
NSTR("Ø123456789ABCDEF",RIGHT$(HX$,1))-1
)
16ØØ I%=I%+1
161Ø RETURN
162Ø ' *** Error Codes ***
163Ø SOUND 5ØØØ,1Ø:SOUND 8ØØØ,1Ø:SOUND 5
ØØØ,1Ø
164Ø PRINT@22Ø-.5*LEN(ER$(ER%)),ER$(ER%)
;
165Ø RETURN
166Ø ' *** Get Code Line ***
167Ø PRINT@173,"";:PRINT USING "Scan lin
e ###";NN%
168Ø IF NN%=-1 THEN PRINT@173,"Scan any
line":GOTO 17ØØ
169Ø SOUND 5ØØ,5
17ØØ INPUT#1,IL$:ER%=Ø
171Ø FOR I%=1 TO LEN(IL$)
172Ø IF MID$(IL$,I%,1)="!" THEN MID$(IL$
,I%,1)="."
173Ø NEXT I%
174Ø IF LEN(IL$)<>1 AND LEN(IL$)<>21 THE
N ER%=4:RETURN
175Ø IF LEN(IL$)=1 THEN LL%=Ø:RETURN
176Ø LL$=LEFT$(IL$,2):LL%=(INSTR("Ø12345
6789ABCDEFGHIJKLMNOPQRSTUVWXYZ",LEFT$(LL
$,1))-1)*36+INSTR("Ø123456789ABCDEFGHIJK
LMNOPQRSTUVWXYZ",RIGHT$(LL$,1))-1
177Ø RETURN
178Ø ' *** Open Program File ***
179Ø PN$=LEFT$(IL$,6):IL$=RIGHT$(IL$,LEN
(IL$)-6)
18ØØ OPEN PN$ FOR OUTPUT AS #2
181Ø RETURN
182Ø ' *** Abort ***
183Ø BEEP:BEEP:BEEP
184Ø PRINT@2Ø9,"ABORT!  Are you sure?";
185Ø INPUT#1,AN$
186Ø IF INSTR("YN",AN$)=Ø THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 185Ø
187Ø PRINT@2ØØ,SPACE$(8Ø);
188Ø IF AN$="Y" THEN CLOSE:KILL PN$+".DO
":GOTO 149Ø ELSE GOTO 128Ø
189Ø ' *** Skip Line ***
19ØØ IF NN%=1 THEN ER%=6:GOSUB 162Ø:GOTO
 128Ø
191Ø BEEP:BEEP:BEEP
192Ø PRINT@21Ø,"SKIP!  Are you sure?"
193Ø INPUT#1,AN$
194Ø IF INSTR("YN",AN$)=Ø THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 193Ø
195Ø PRINT@2ØØ,SPACE$(8Ø);
196Ø IF AN$="Y" THEN NN%=NN%+1
197Ø GOTO 128Ø
198Ø ' *** Stop & Save ***
199Ø BEEP:BEEP:BEEP
2ØØØ PRINT@2Ø7,"STOP & SAVE! Are you sur
e?";
2Ø1Ø INPUT#1,AN$
2Ø2Ø IF INSTR("YN",AN$)=Ø THEN BEEP:PRIN
T@251,"Scan 'YES' or 'NO'":GOTO 2Ø1Ø
2Ø3Ø PRINT@2ØØ,SPACE$(8Ø);
2Ø4Ø IF AN$="Y" THEN 149Ø ELSE GOTO 128Ø
2Ø5Ø ' *** Resume ***
2Ø6Ø IF NN%<>1 THEN ER%=5:GOSUB 162Ø:GOT
```

```
0 128Ø
2Ø7Ø PRINT@254,"Resume Mode";
2Ø8Ø NN%=1:GOSUB 166Ø
2Ø9Ø IF LL%=Ø THEN ER%=5 ELSE IF LL%<>1
THEN ER%=1
21ØØ IF ER%>Ø THEN GOSUB 162Ø:GOTO 2Ø6Ø
211Ø PN$=MID$(IL$,3,6)
212Ø ON ERROR GOTO 214Ø
213Ø OPEN PN$ FOR INPUT AS #2:GOTO 217Ø
214Ø RESUME 215Ø
215Ø CLOSE #2
216Ø ER%=7:GOSUB 162Ø:GOTO 127Ø
217Ø CLOSE #2:OPEN PN$ FOR APPEND AS #2
218Ø NN%=-1:GOTO 128Ø
```

TSTATS.BCR (FROM PAGE 100)







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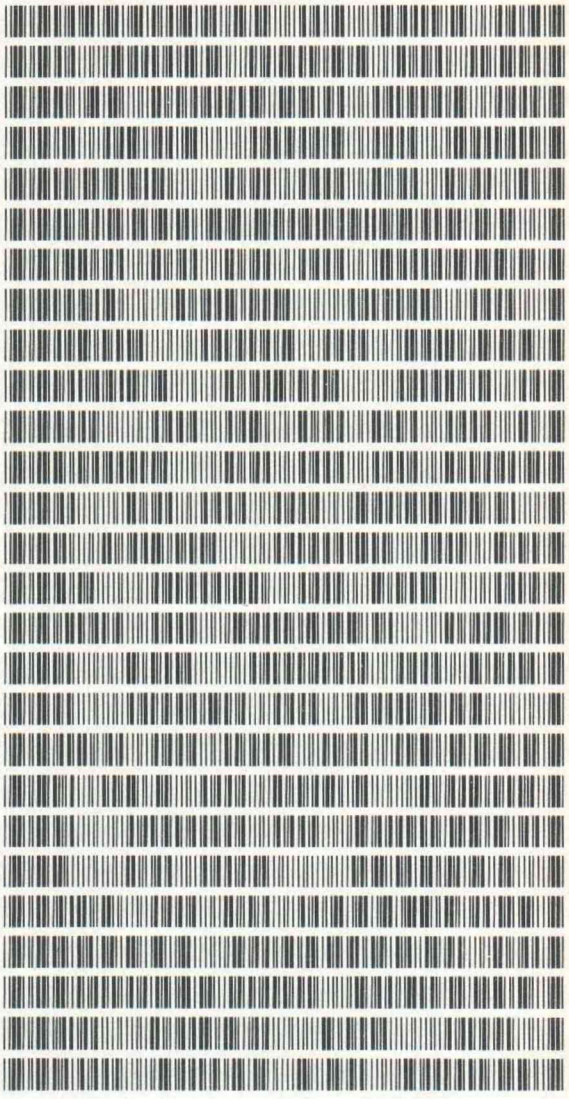

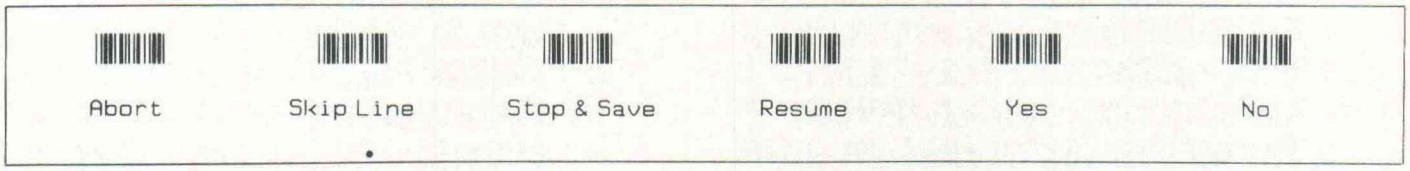

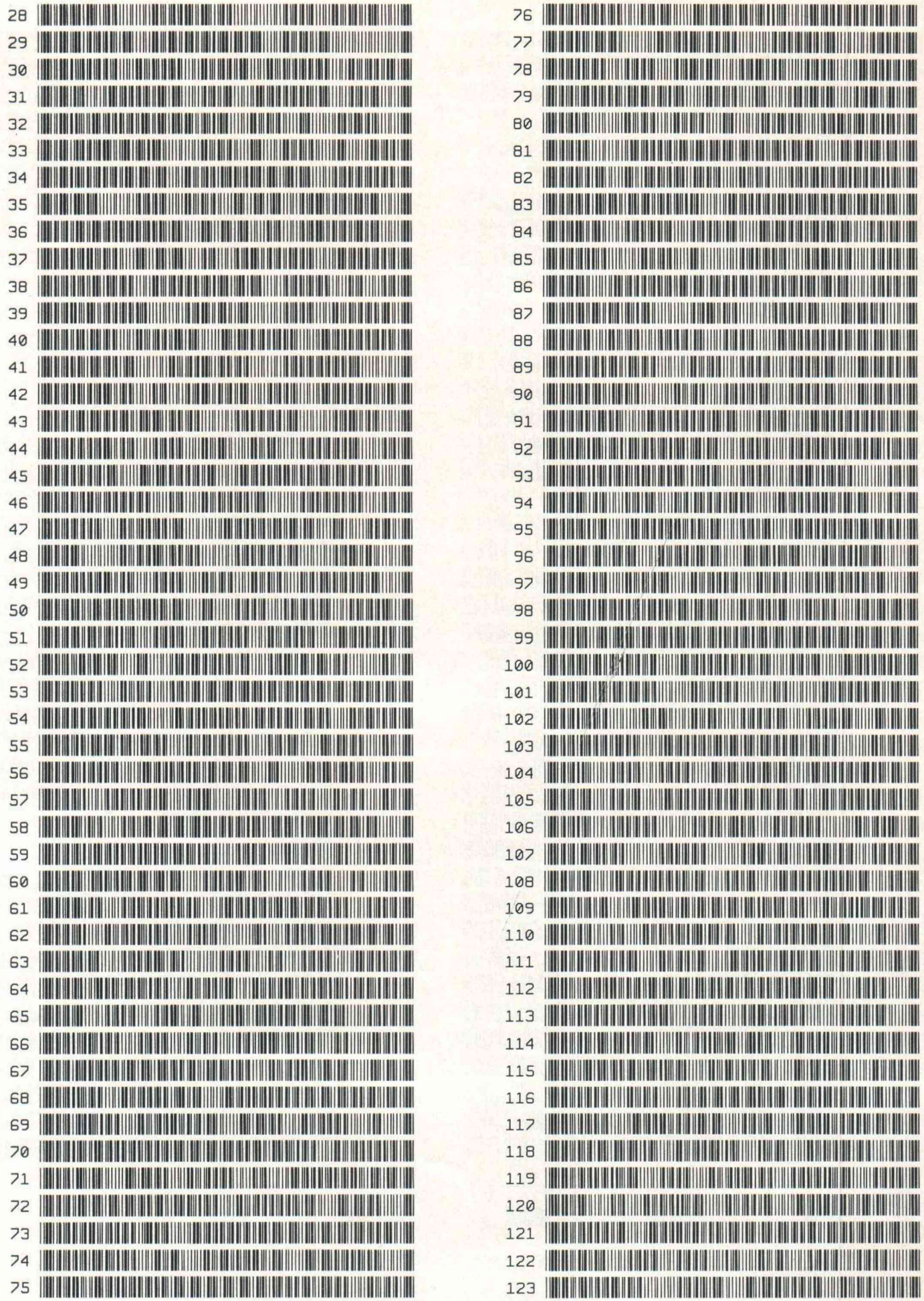

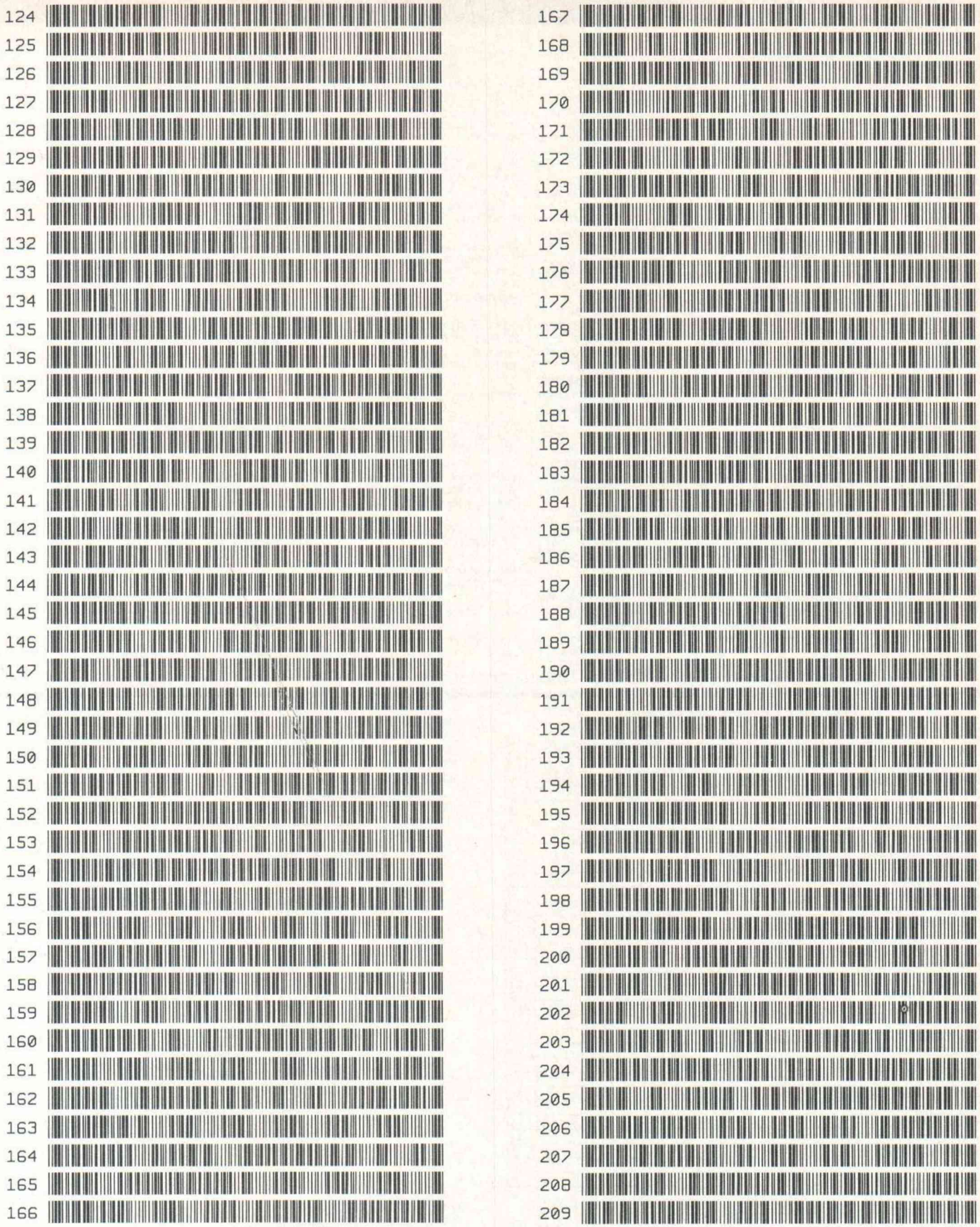
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Abort
Skip Line
Stop & Save
Resume
Yes
No

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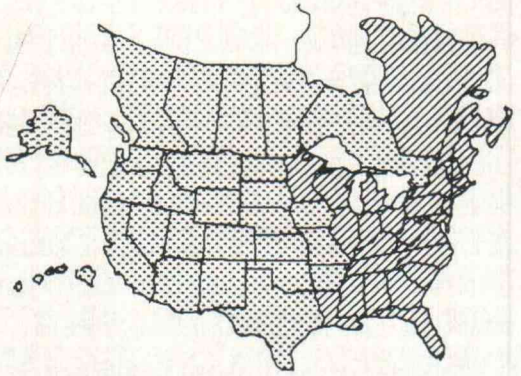

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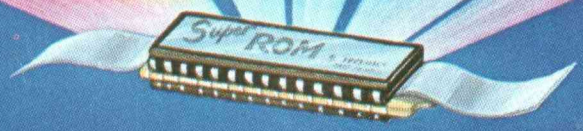
Lucid Spreadsheet Write ROM Database Outliner



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